MONTHLY WEATHER REVIEW.

Editor: Prof. CLEVELAND ABBE. Assistant Editor: HERBERT C. HUNTER.

VOL. XXXV. JULY, 1907. NO. 7.

The MONTHLY WEATHER REVIEW is based on data from about 3500 land stations and many ocean reports from vessels taking the international simultaneous observation at Greenwich noon.

Special acknowledgment is made of the data furnished by the kindness of cooperative observers, and by R. F. Stupart, Esq., Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt. I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Director Meteorological Office, London; Maxwell Hall, Esq., Government Meteorologist, Kingston, Jamaica; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

As far as practicable the time of the seventy-fifth meridian is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

FORECASTS AND WARNINGS.

By Prof. ALFRED J. HENRY, temporarily in charge of Forecast Division.

IN GENERAL.

Barometric pressure over the British Isles was low during the first and third decades of the month and high during the second decade. The weather, on the whole, was cool and rainy, except during the anticyclonic condition which prevailed from the 11th to the 20th. Over the Atlantic in the vicinity of the Azores pressure was uniformly high from the 1st to the 13th, and again from the 16th to the 20th. The last-named period was one of high pressure over the whole of western Europe, including Iceland, and from the Azores westward to the United States. On the 17th a rise of pressure occurred simultaneously over the Azores, Bermuda, the West Indies, and the eastern portion of the United States, the rise amounting to as much as a tenth of an inch at two of the West Indian stations. This great high maintained itself only about two days; on the 18th it was separated into several portions by an area of falling pressure that advanced from the westward.

In the United States the movement of highs and lows, of which there was about the usual number, was uniformly along the northern boundary, as may be seen by reference to Charts Nos. II and III. As a result, the lower layers of the air did not become unduly heated for periods of more than a day or two at a time, and no unusually high maxima were registered, except in Washington and Oregon, during the closing days of the month. In connection with the high temperatures experienced on the Pacific coast, a case of sunstroke was reported at Bellingham on the 31st.

During the eastward movement of high pressure area No. I unusually low temperatures were recorded in the Lake region, the Ohio Valley, and the Middle Atlantic States. Light frost was reported in southeastern Michigan and northern Ohio on the morning of the 3d; no general damage was done, altho potato vines were killed in localities.

The rainfall was about normal, except in Texas and the Southwest, New England, and New York, where more or less droughty conditions prevailed.

Severe local storms occurred on a number of dates and in various localities. In Wisconsin a series of small tornadoes swept over the counties of Jackson, Monroe, Wood, and Fond du Lac on the night of the 3d. Twenty-six people were reported killed, about twenty were injured, and the damage to property was estimated at $100,000. A small tornado also struck Williston, N. Dak., on the 20th and demolished a number of dwellings, one person being killed in the wreckage. A tornado occurred near Mount Vernon, S. Dak., on the 13th; one life was lost. Severe thunderstorms, attended by high winds and torrential rains, were the cause of much damage to growing crops in various localities. Bridges were washt away, telegraph and telephone lines were prostrated, and the movement of trains was interrupted by the severity of the elements. Some of the most severe storms occurred on the following dates: 3d, 4th, and 5th, in Wisconsin and adjoining territory; 5th, in Ohio; 9th, in the Ohio Valley, especially at Louisville, Ky.; 10th, in Iowa, Illinois, and Indiana, two persons being killed in Indiana; 14th, heavy rains in northeastern Kansas and southeastern Nebraska occasioned an estimated loss of half a million dollars; 18th, heavy rains and severe electric storms occurred thruout West Virginia and portions of Maryland, being particularly severe at Baltimore; 21st, a severe storm in southern Wisconsin, especially at La Crosse, caused an estimated loss of $500,000; 22d, severe electric storm at Parkersburg, W. Va.; 24th and 25th, severe electric and rainstorms in Ohio, West Virginia, and western Pennsylvania; 29th and 30th, damage by wind, hail, and lightning sustained in Vermont.

Two very destructive hailstorms were reported, the first in Mills County, Iowa, where the local newspapers estimated that the crops over 80,000 acres of land were completely destroyed, entailing a loss of about $1,000,000. The second storm occurred in the southern portion of Brown and Spink counties, South Dakota, where it is reported 160 square miles was swept by the storm.

BOSTON FORECAST DISTRICT.

The weather of the month was marked by generally high temperatures, abundant sunshine, and severe local storms in some sections. The precipitation was normal to excessive in northwestern Maine, and the extreme northern sections of New Hampshire and Vermont, and below the average in nearly all other sections of the district. The greatest deficiencies in the monthly amounts occurred in eastern Massachusetts and in Connecticut, and ranged from 2 to over 3 inches below the July average. General rains fell on the 12th, 20th, and the 26th, but otherwise the precipitation of the month was from local showers. The temperatures ranged near the seasonal average thruout the district. The maximum temperatures were generally on the 17th or 18th, and the minimum temperatures, with a few exceptions, occurred on the 4th. July, as a whole, was a very pleasant month

No storm warnings were issued during July, and there were no storms without warnings.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

The temperature was above the normal over the greater portion of the district during the month. There was a period of showers from the 9th to the 13th, inclusive, but for the month as a whole the rainfall was considerably below the normal. No general storm occurred along the west Gulf coast, and no warnings were issued.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

The main features of the month were two periods of excessive heat, which prevailed from the 5th to the 10th and from the 15th to the 25th, inclusive. These prolonged heat waves were due to the persistence of high pressure areas over the southwestern quarter of the United States, and caused much suffering and many prostrations. The rest of the month, however, was quite cool, and thunderstorms were quite frequent after the 8th, especially in Kentucky. Occasional thundershowers gave temporary relief locally even during the heated periods, except previous to the 9th when it was not only hot but very dry.

Three or four general storms past over the Ohio Valley during the month, spreading general showers and some locally excessive rains.

A severe thundersquall past over the city of Louisville the afternoon of the 9th which unroofed many houses, destroyed hundreds of trees and spread destruction generally to the amount of many thousands of dollars. One man was killed and some twenty persons injured, also some twenty or more horses were killed by falling trees or live electric wires.

No special warnings were issued during the month, and none was called for.—*F. J. Walz, District Forecaster.*

CHICAGO FORECAST DISTRICT.

The frequency of showers and thunderstorms generally thruout the north-central and northwestern States was a feature of the month.

Temperatures averaged high. Periods of excessive heat were, however, of short duration.

Severe gales were not experienced on the upper Lakes. Squalls calculated to imperil vessels were forecast. Storm warnings ordered on the 15th of the month for indicated dangerous squalls on Lake Michigan were not verified by wind velocities reported at stations of observation.

Frost was not reported in the agricultural districts.—*E. B. Garriott, Professor of Meteorology.*

DENVER FORECAST DISTRICT.

Temperatures during the month were slightly below normal to the west of the Continental Divide, and practically normal on the eastern slope. Rainfall was in excess over Arizona, southern Utah, and the eastern plains region in Colorado and Wyoming, and much below normal in New Mexico.

Special warnings were issued for the rise in the Arkansas river that followed the excessive rain of the 26th. No other warnings were issued or required.—*P. McDonough, Local Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

Light showers occurred in California on July 2 in connection with a moderate depression, apparently of the secondary order, which developed suddenly over Oregon. The usual summer low over the valley of the Colorado was in evidence early during the month, and thunderstorms with showers in the mountains of southeastern California and Arizona were frequent.

There were no storm nor frost warnings issued during the month.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.

Near the close of the month a short hot spell of unusual severity prevailed west of the Cascade Mountains, and temperatures of 100° or more were common in many localities. There were more than the usual number of thunderstorms, and the rainfall averaged above the normal, except along the southern border of the district, where it was slightly less than usual.

There were no damaging winds or frosts during the month, and no warnings were issued.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

The only flood of consequence occurred about the middle of the month in the Des Moines and Illinois valleys and in that portion of the Mississippi Valley between the mouths of the Des Moines and the Missouri rivers. It was caused by the heavy rains that fell on the 9th and 10th and from the 14th to the 21st inclusive, especially on the 14th and 15th. While flood stages were not general there was a great amount of damage done, chiefly to growing corn, vegetables, and unthrashed wheat. Some portions of the city of Des Moines, Iowa, were flooded, as was also a great portion of the unprotected bottom lands. All levees remained intact, and none was at any time considered in danger. Stock and other portable property were removed, as the Weather Bureau warnings were issued in ample time to permit this.

Damage of the same character was done along the rivers of eastern Kansas and along the Missouri River from St. Joseph southward, and stages from 1 to 3 feet above the flood stage were general. Warnings were issued for these floods at the proper time.

A moderate flood in the Trinity River of Texas from the 12th to the 15th, inclusive, was also well forecast on the 11th, a stage of 30.3 feet, 5.3 feet above the flood stage, occurring at Dallas, Tex., on the 13th and 14th.

In addition to these floods in the larger rivers, there were numerous floods in the smaller streams at the same time. It was impracticable to issue warnings for these floods, except along the Tygarts Valley River of West Virginia, where a warning from the local office of the Weather Bureau at Elkins, W. Va., proved to be of much benefit, altho great damage was done to houses, roads, and bridges of all kinds, and to growing crops.

The Willamette River at Portland, Oreg., fell below the flood stage of 15.0 feet on the 16th, marking the end of the rise in the Columbia River for the year 1907. An account of this rise follows:

The 1907 annual rise in the Columbia River, by Mr. E. A. Beals, in charge of local office, United States Weather Bureau, Portland, Oreg.

The annual rise of the Columbia River is due almost wholly to the melting of the winter's snow in the mountains and foothills within the drainage area of the river, and there are two conditions governing the height of the flood crests in the lower stretches of the stream.

First. If the weather is sunny and a protracted hot spell occurs in May, high water is almost certain in the lower Columbia River; but if there is more than the usual amount of cloudiness during May and the temperatures are below normal, the snow melts slowly and the flood crest in the lower stream is never very high. There is seldom a year that there is not enough snow in the mountains to cause a serious flood if it melts quickly, therefore it is the manner in which the snow melts, rather than its amount, that ordinarily determines the height of the spring water in the Columbia River.

Second. Should the crest coming down the Snake River join that coming down the upper Columbia River, the lower stream will reach a higher stage than will be the case if the crest in one of these streams passes the junction of the two rivers before the arrival of the other. The Snake River crest usually passes into the Columbia River before the crest from the upper Columbia River reaches the junction point. This is due to

the lower latitude of the Snake River, which results in the increased heat of the spring being felt in that basin before it is felt in the more northern one of British Columbia and northwestern Montana.

The most reliable record of the temperature and precipitation over the drainage basins of the upper Columbia and the Snake rivers is that published in the MONTHLY WEATHER REVIEW under the subheading "Northern plateau". The reporting stations in this district are not situated in the mountains, but they are situated in the habitable valleys near them, and they probably portray, but in somewhat lesser degree, the conditions experienced in the mountains themselves.

The total precipitation and the mean temperatures, together with the departures from normal, in the northern plateau for the months of November and December, 1906, and for January, February, and March, 1907, are given in Table 1.

TABLE 1.—*Temperature and precipitation of northern plateau during cold season of 1906–7.*

Month.	Temperature.		Precipitation.	
	Mean.	Departure.	Total.	Departure.
1906.				
November	45.5	+0.1	8.54	+1.6
December	42.6	+0.7	7.03	−1.4
1907.				
January	35.1	−4.1	5.68	−1.8
February	43.6	+3.1	5.06	−0.6
March	42.8	−1.4	3.45	−1.8
	41.9	−1.6	29.76	−4.0

It will be seen by this table that last winter during the period of snowfall there was about 4 inches' deficiency in precipitation and an accumulated deficiency of 1.6° in temperature. Reports gathered at the end of March from snowfall reporters in western Montana, British Columbia, Idaho, and northwestern Wyoming, were to the effect that there was more than the average amount of snow on the ground at that time, and if the amount of snow in the mountains is the only gage for the height of the subsequent flood crest, then unusually high water was to be expected later on.

The mean temperature in the northern plateau during April and May, 1907, was nearly normal, being only 0.3 above normal in April and 0.9 above in May. Also during these months there were no unusual or protracted hot spells; but, instead, the variations from day to day were quite small and uniform.

Table 2 shows the highest water that occurred during the annual rise this year and its date at all stations in this district, except the stations on the Willamette River above Portland, which are not affected by the annual rise in the Columbia River.

TABLE 2.—*Flood crests, Columbia watershed, 1907.*

Station.	Height.	Date.	Station.	Height.	Date.
	Feet.			*Feet.*	
Bonners Ferry, Oreg.	23.8	July 1.	Celilo, Oreg.	17.3	June 4.
Newport, Wash.	16.7	June 15.	The Dalles, Oreg.	34.1	June 5.
Lewiston, Idaho	15.6	May 20.	Cascade Locks, Oreg.	26.8	June 9, 10, 11.
Wenatchee, Wash.	34.9	June 4, July 5 and 6.	Vancouver, Wash.	20.1	June 10.
Umatilla, Oreg.	20.5	June 4.	Portland, Oreg.	19.2	June 6, 7, 8, and 10.

In fig. 1 will be found hydrographs showing the behavior of the river at Wenatchee, Wash., which is on the Columbia River, a little over 200 miles above the junction of the Columbia and Snake rivers; at Lewiston, Idaho, on the Snake River, nearly 200 miles from its mouth; and at Portland, Oreg. Portland is on the Willamette River about 10 miles from its mouth, and during the annual rise in the Columbia River backwater causes practically the same stage in the Willamette River at Portland as that in the Columbia River 10 miles below Portland.

For the purpose of comparison, there is submitted herewith Table 3, showing the stages of all the recorded flood crests at Portland due to the annual rise in the Columbia River.

TABLE 3.—*Flood crests at Portland, Oreg., during the annual rise of Columbia River.*

Year.	Stage.	Year.	Stage.	Year.	Stage.	Year.	Stage.	Year.	Stage.
	Feet.		*Feet.*		*Feet.*		*Feet.*		*Feet.*
1879	19.3	1885	14.5	1891	14.1	1897	23.7	1903	24.0
1880	27.3	1886	20.0	1892	19.3	1898	20.7	1904	20.8
1881	19.7	1887	25.7	1893	22.0	1899	24.2	1905	13.6
1882	26.1	1888	18.2	1894	33.0	1900	17.8	1906	13.4
1883	17.8	1889	10.0	1895	16.3	1901	20.8	1907	19.2
1884	20.2	1890	20.1	1896	23.8	1902	20.7		

The highest and lowest water, mean stage, and monthly range at 212 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississipi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

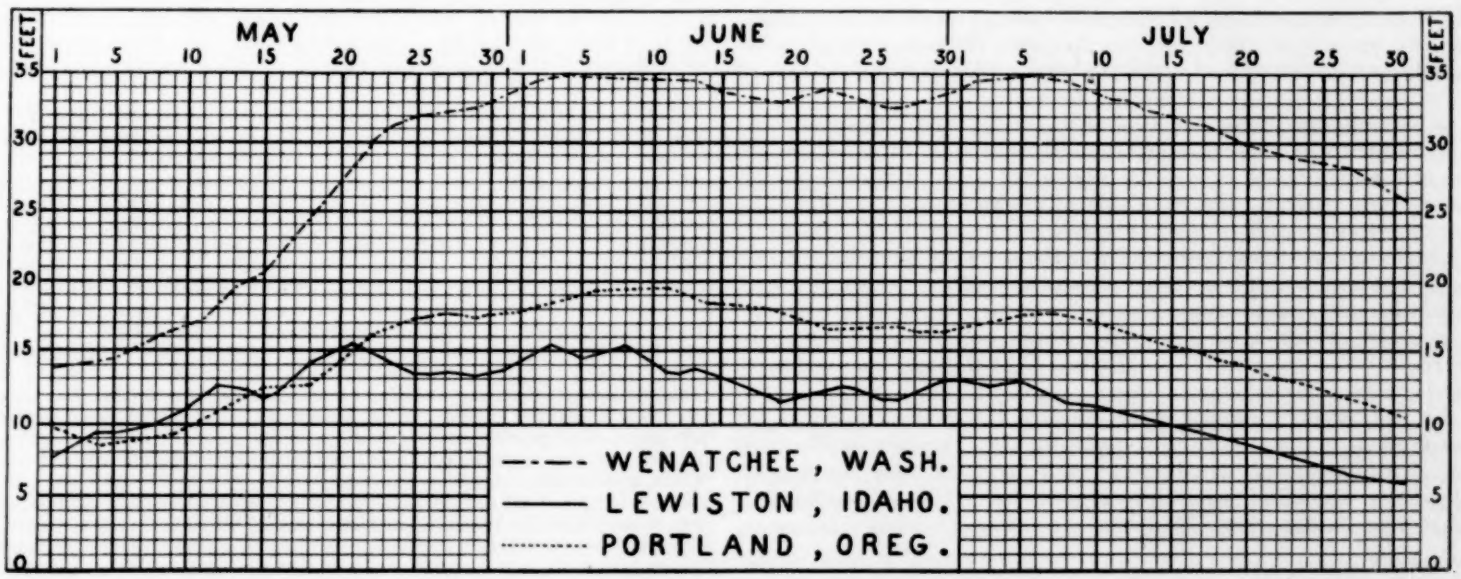


FIG. 1.—Hydrographs showing daily stages, Columbia River system, May, June, and July, 1907.

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

THE FUNDAMENTAL INTERVAL IN METEOROLOGICAL AND CLIMATOLOGICAL STUDIES, ESPECIALLY IN CHARTS OF ISOHYETAL LINES.

It is a well-recognized principle in meteorology that a comparison of averages for different countries, or for different parts of the same country, is liable to lead to erroneous conclusions unless we are careful to compare data for the same hour, day, year, or group of years. It is frequently difficult to do this because the records are fragmentary as to months and years and the observers have used such a variety of hours of observation. The labor of obtaining from broken records the approximate values proper to a continuous series of years is very great, and in fact distasteful to many climatologists, so that the published charts of mean values are often a collection of heterogeneous data that are not properly comparable with each other. The necessity of adopting and rigidly adhering to definite fundamental intervals when constructing a chart of rainfall was fully presented to our readers in the MONTHLY WEATHER REVIEW for April, 1902,[1] and the same principles apply to all other meteorological data. Interesting technical and historical details are given by Prof. Dr. George Hellmann in his exhaustive memoir on the precipitation of the watersheds of the north German rivers, published at Berlin in 1906.[2] In three large volumes Hellmann deals with about 4000 rainfall stations; the available records begin with one station in 1701 and end with 3672 stations in 1890. He adopts 1851–1900 as the fundamental interval or base period for all his studies and charts.

The records can not be combined into one perfectly satisfactory system because the observers have had different points of view in mind. Some have paid attention to heavy rainfalls, others to both light and heavy equally. Some have recorded the depth of snow in inches and others the depth of the equivalent water. Some have recorded the number of days of precipitation above an arbitrary lower limit, say one millimeter, others have recorded the slightest possible sprinkle. Some have measured by weight, others by volume, others by depth of rainfall. The total collected material must therefore be divided and studied according to the individual peculiarities of the observers and their records. Hellmann says "the correctness of these rainfall tables depends upon the view that is taken of the precipitation, and strange as it may seem there scarcely exist anywhere in meteorology data that are less reliable and less comparable as to uniformity than those of precipitation. The individual views, the accuracy, and the mode of life of the observer play an important part, and these personalities can only be excluded by the uniform introduction of self-registering apparatus of uniform type and delicacy."

STYLE OF GAGE.

In his efforts to reduce all his data to a uniform system of intercomparable averages, Hellmann begins with a study of the influence of the shape and construction of the rain-gages themselves. With regard to this point he states that the oldest gages consisted of a simple receiving cylinder. The precipitation evaporates so easily from these gages that the greatest attention on the part of the observer is necessary; the rainfall must be measured without delay, and falls of one-hundredth of an inch are quite often not measured but lost. Moreover, the gages were so shallow that the snow was always liable to be whirled out of them.

An item that especially interests us is Hellmann's account of the conical gage which was used by the physicians Kanold and Kundmann, of Breslau, in 1717 to 1727, and which was originally described with drawing at page 160 of the Sammlung von Natur- und Medecin- . . . Geschichten. Sommer Quartal 1717. Breslau 1718. Quarto. Page 160. Hellmann states that before knowing of the work of the Breslau physicians he had himself modified his own rain gage of 1886 in an analogous manner, allowing the vertical cylinder to terminate below in a cone, so that the first part of a very slight rainfall could be measured most accurately.

A conical gage was introduced to American observers by Simeon De Witt about 1807, and is described by him in the American Journal of Science. We had always supposed this to be an American invention until historical research brought to light this older German usage.[3]

Altho the older authors describe clearly the conical mouth of the gage, with the various additional devices for measuring the catch, yet the method of weighing rather than measuring the rainfall seems to have been the favorite at all the early German stations. The use of a special small graduated glass cylinder was introduced much later.

EXPOSURE OF RAIN GAGE.

With regard to the exposure of the rain gage Hellmann justly remarks that this is vastly more important than any peculiarities of instrumental construction. The diminution of rainfall with altitude was known for a century before it became clearly understood that this apparent diminution of rain is purely an instrumental error due to the influence of the wind at the mouth of the rain gage, and Hellmann claims for himself the important conclusion that it is wrong to require that rain gages shall be placed on or near the ground and be exposed as freely as possible to the wind. This discovery is of more importance now that our rain gages are so often placed high above the ground, whereas formerly they were in protected spots in gardens or farms. Hellmann properly states that no general law for the conversion of the catch of the gage into true rainfall has yet been found. We think, however, that if several gages of the same type are similarly placed (e. g. upon posts), in the same locality in an open field, at different heights above ground, the differences in their records should give us the means of approximately correcting for the wind effect. In the protected gages of Joseph Henry (1853), F. E. Nipher (1878), and R. Boernstein (1884), as well as in the protected gages established by Hellmann in the centers of deprest roofs or protected by battlements, we attain results that are very nearly independent of the wind. The rule that rain gages should be established one meter above the ground in Europe, or one foot above the ground in Great Britain, should be supplemented by the rule that they must also be protected from the wind. Hellmann quotes the results of observations in Germany, in 1896, showing that they agree with those made elsewhere in proving that the difference between gages at the ground and at one meter

[1] Vol. XXX, p. 205–243.

[2] See Monthly Weather Review for July, 1906, Vol. XXXIV, p. 328.

[3] Hon. Simeon De Witt was born about 1755 and died at Ithaca, N. Y., December, 1834. He was for a long time surveyor-general of the State of New York, and was also one of the regents of the university. He published many contributions to knowledge and was a man of strong character and great influence. In an obituary notice Prof. Benjamin Silliman says: "The Hon. Simeon De Witt was an eminent patron and cultivator of useful knowledge, and himself possessed high scientific attainments, especially in astronomy, engineering, and general physics. We deeply lament his loss, not only as a friend of science, but as a pure patriot, a zealous and indefatigable public officer, an estimable citizen, and an honest man". (Amer. Jour., Sci., Vol. 27, 1834, 395.)

In 1807 De Witt read before the Albany Institute (see Vol. 1, page 60 of its transactions) a description of an elaborate conical rain gage; but as this was costly in construction, he afterwards (May 3, 1832) described a much simpler and cheaper form, known as "De Witt's 9-inch conical rain gage," and gave examples of the records made with it during April and May of that year (see the American Journal of Science and Arts, vol. 22, p. 321–324.)

There is no certain evidence De Witt had any knowledge of the conical gage used by Kanold and Kundmann in 1717–1727, but it is not impossible that he may have heard of this device for measuring small rainfalls thru mention of it in some of the numerous works that were accessible to him at Albany and Ithaca.—EDITOR.

above the ground is 6 per cent, and diminishes regularly with altitudes. He also shows that the diminution is greatest in cold months.[4]

ANNUAL VARIABILITY.

On page 37, of this volume, Hellmann takes up the question of the reliability of any mean annual rainfall so far as that depends upon the variability of the weather from year to year, showing very plainly that only the means that are based upon many years of observations, and as far as possible on simultaneous records, can lead to reliable results as to the geographic distribution of rainfall. His study, moreover, shows us how mean values deduced from shorter periods may be utilized to this end. The first step is to secure a long series from several stations—he quotes 14 for which he has records for fifty years or more. For each of these the mean is taken for each period of five, ten, twenty, thirty, and forty years for comparison with the mean for sixty years. The differences show us that for the German stations the mean of any five years will differ by 5 or 10 per cent from the mean of any other five; that the variability of the mean annual rainfall increases decidedly as we go inward from the ocean; that the range of the average of twenty years may be from 15 to 30 per cent of the total rainfall; that in order to obtain a rainfall average that is correct to within plus or minus 2 per cent we must have a complete record of at least thirty and in many cases over forty years. These statistical studies in accordance with the method first published by Koch, in 1887, and Blanford, in 1892, if applied to the more variable climate of the United States would undoubtedly require us to wait until we have fifty years of observations under uniform exposure of the rain gage before attributing to its mean records an accuracy of plus or minus 2 per cent.[5]

On page 41, of Hellmann's memoir, is given an equally important study relative to the frequency of dry years and wet years. If we convert each annual rainfall at Gütersloh from millimeters into a corresponding percentage of the normal annual rainfall and then out of the 64 years of record pick out the ten wettest years and again the ten driest, we find the average precipitations to be 124 and 73 per cent, and the difference between them is 51 per cent of the normal rainfall. If only one could foresee when these extremely wet and dry years would occur. But, as yet, this is as impossible for Europe as it is for America.

REDUCTION TO THE FUNDAMENTAL PERIOD.

There were only 109 stations available to Hellmann for computing annual average rainfalls for his fundamental period of fifty continuous years preceding 1900, and these stations are not sufficient to form a reliable rainfall chart of Germany. He, therefore, set himself the problem of reducing the shorter and fragmentary series to what they would have been if continued during the whole of this fundamental period. In this connection he states, on page 42, that according to the Annuaire of the Meteorological Society of France[6] the hydraulic engineer, Fournié, in 1864 first established the rule that the ratio of the annual rainfall at neighboring stations is nearly constant from year to year, but that this is not true for stations far apart, and this principle was long used by the engineers before it was adopted by the meteorologists. In 1872 J. Karsten discust the question whether the method used for reducing mean temperatures to a common basis and to a normal station could not also be used for rainfall. In studying the rainfall Karsten used the differences between neighboring stations, rather than the ratios, and found fairly good results, but only when the rains were uniformly distributed and when extreme values were rejected and when the stations were very near and under similar influences. He found that in summer time heavy local thunderstorms disturbed all such relations. In 1880 Hann, and in the same year, also, Hellmann himself modified and made use of Karsten's idea. The fundamental basis of Karsten's method is the assumption that the great variations of rainfall occur simultaneously over broad regions. The same principle has been adopted concerning temperature for many years past, but temperature is much more regular than rainfall. Before applying Karsten's method Hellmann studied the ratios of pairs of stations that are only one, two, or three kilometers apart, as is done in Fournié's method, and finds that the ratio, which should be unity, actually varies between 1.144 and 0.930 in the forty-four cases that he cites for four stations. These stations were chosen because the rain gages were alike and with the best exposures, but if the gages have bad exposures the ratios are much more variable and irregular, and so also if the gages are at greater distances apart. The irregularities are also, of course, increased whenever there is any change in the homogeneity of the series due to a change of gages, exposures, hours of observation, or observers, so that by studying the relation between the records of two stations we can even ascertain the value of the different parts of the long series. On page 46 is given a very important table showing year by year the ratio between the respective annual rainfalls, as also the departures of these ratios from their average values for four pairs of stations, which are separated from each other, approximately, as follows:

Station.	State.	No.	Lat. N.	Long. E.	Altitude.
			° ′	° ′	*Meters.*
Berlin	Brandenburg	.....	52 30	13 23	32
Torgau	Sachsen	593	51 34	13 00	99
Cologne	Rheinland	346	50 56	6 57	60
Bonn	Rheinland	345	50 44	7 6	56
Geissen	Hesse	298	50 10	9 21	203
Frankfort, a. M.	Hesse	281	50 7	8 41	104
Gütersloh	Westphalia	48	51 54	8 23	77
Lingen	Hannover	51	52 31	7 19	25

Berlin south 5° west 120 kilometers to Torgau.
Cologne south 30° east 30 kilometers to Bonn.
Geissen south 2° east 55 kilometers to Frankfort.
Gütersloh north 45° west 100 kilometers to Lingen.

The ratios of the annual rainfalls of these stations vary between 1.43 and 0.75; that is to say, one station of a pair has a rainfall that is sometimes 43 per cent above and at other times 25 per cent below the rainfall for the other station. The oscillations of the ratio may be as large as 67 per cent for one pair, viz: Berlin-Torgau, but the amount is only 47 per cent for the best pair, viz: Gütersloh-Lingen. The ranges do not depend simply upon the distances of the stations apart. Even if we compute the ratios not for individual years, but for the lustra or five-year periods, still they have a very large range, as is shown by tables for twelve different groups of stations; so that in general neither individual years nor individual lustra can profitably be reduced to the means for the fifty-year fundamental epoch.

In order to determine more exactly the influence of the distance from each other of a pair of stations the records for Berlin were compared with those for twenty other stations located at distances of from 94 to 655 kilometers, most of them, however, stretching in a belt from east-northeast to west-southwest, nearly parallel to the coast of Germany and Holland. The average departure of each annual ratio from its mean value increases from 12 per cent for the nearby stations

[4] Various interesting details on this subject will be found in an article written by the Editor in 1887, and printed in the Monthly Weather Review of October, 1899, Vol. XXVII, pp. 464–468.

[5] The errors of short-period rainfall registers in the United States were briefly discust by Prof. A. J. Henry, in Weather Bureau Bulletin D, (1897), p. 9. For the eastern coast of the country the possible error of a ten-year period was found to be 16 per cent of the normal annual amount; for the interior valleys 17 to 20 per cent; and for a Pacific coast station only 10 per cent. The conclusion reached by the author was that at least thirty-five or forty years of observation are necessary to obtain a result that will not differ more than plus or minus 5 per cent from the normal.

[6] See the Annuaire for 1865, p. 20.

up to 18 per cent for the more distant ones; the results being charted show that in north Germany it will always be advantageous to reduce the precipitation for any station to the fundamental period by using stations to the westward as normal stations.

The limit of the error introduced by reducing mean rainfalls for a short period to those belonging to the fundamental period is worked out by Hellmann according to a method that he applied in 1875 for the reduction of French observations, and he concludes that his isohyetal chart for 1851–1900 is liable to be in error in some places by from 8 to 12 per cent of the local rainfall when the local stations have only ten or fifteen years of observations, but by less than 5 per cent when thirty years of records are available.

ANNUAL PERIODICITY.

The annual periodicity of the rainfall is based upon monthly means from all stations for which there are over 35 years' records. Here again we have to face the fact that the monthly means are not comparable among themselves, owing to the various lengths of the months, and some correction must be made before we can ascertain precisely the character of the annual periodicity. The difference between the 28 days of February and the 31 days of some other months is equivalent in fact to 10 per cent of the monthly rainfall. Hellmann prefers to express the monthly rainfalls as percentages of the total annual for each locality without making other theoretical corrections. Renou reduced the rainfalls for any calendar month to its value for a month of normal length, namely, 30.42 days; H. Meyer reduced each month to an equivalent for 30 days; Quetelet and Kreil adopted the quotient of the number of days of rainfall by the number of days in the month, and ascribed the average daily rainfall to that day of the year or that longitude of the sun that corresponded to the middle of the month. Even Angot's method of relative excesses or his pluviometric coefficients (apparently due to Renou) only imperfectly overcomes the irregularity due to the unequal lengths of the months. Hellmann points out that all these methods lead to the same result if instead of actual rainfalls we use monthly rainfalls exprest as percentages of the total annual. In his lithographic Plate No. 1 [not reproduced] he gives the annual curves of percentage of precipitation for all of his 35 and 50-year stations, about 90 in all.

The distribution of rainfall in Germany by percentages for the four seasons—winter, spring, summer, and autumn—brings out clearly the contrast between continental and oceanic influences, and this is summarized in Hellmann's figure 7, page 82, which shows the percentage of precipitation in the colder half of the year, October to March, exprest as a percentage of that which falls in the warmer half of the year, April to September. Thus for Bonn, on the average of fifty years, 41.8 per cent of the total annual precipitation falls in winter and 58.2 falls in summer. The lines of equal winter percentage show a steady diminution from 50 per cent in the northwest toward 30 per cent in the east and southeast. Thus in the valley of the lower Rhine the precipitation is evenly divided between winter and summer, but in the valley of the upper Oder the summer rainfall is almost twice that of the winter. These relative quantities of rainfall and snowfall are the vitally important factors in all studies of forestry, agriculture, and hydraulic engineering, and, as the Editor has pointed out, in glacial climatology also. Similar studies applied to the Nile, the Mississippi, and the great rivers of India and China have a direct bearing upon broad problems of internal navigation and irrigation.

Hellmann's maps on page 84, showing the months of heaviest and lightest rains, depict the region of heavy rains moving northward into Denmark; the month of September appears unimportant, whereas meteorologists have generally stated that this is the month of maximum rainfall in Schleswig-Holstein, an error that seems to have arisen from the study of various short series of observations. The annual movements of the areas of heaviest and lightest rainfall are not explicable by any study of the movements of the areas of high and low pressure.

As we may determine daily mean temperatures from the daily maxima and minima, so Hellmann studies to what extent we can determine the annual rainfall from the records of the three driest and three wettest months. With the assistance of W. Meinardus, who examined about thirty different stations from this point of view, he has discovered that the principal features of the annual rainfall are analogous to those of the wettest and driest months, so that there is a nearly constant ratio between the mean annual rainfall and that of the months of heavy rainfall. On the average of fifty years, the month having the heaviest rainfall has about 18 per cent of the annual rainfall, the month having the next lowest rainfall has about 14.5 per cent of the annual rainfall, and the next lowest month has about 12 per cent, so that the sum total of the three wettest months averages 42.44 per cent of the total annual.

The preceding studies give no evidence of any periodicity, except the daily and annual periodicities in the rainfall, and relate only to the so-called irregular or nonperiodic departures which in view of our limited knowledge we call accidental variations from normal conditions, but Hellmann now proceeds to the search for truly periodic variations.

Being given a series of monthly means for many years, if we take the general averages by months, then the difference between the month that has the highest average and the month that has the lowest average in the *mean periodic range*. If, however, we pick out the highest and the lowest monthly values for each year and take the average of the resulting extreme annual ranges we obtain the so-called aperiodic range which is larger than the periodic because the extremes of rainfall do not always occur in the same month. Thus for Königsberg, Hellmann finds a mean periodic range that is 7.5 per cent of the annual rainfall while the mean aperiodic range is 15.9; the maximum range for any year is 27.3, and the minimum is 6.4. In general the *minimum value* of the *aperiodic range* at any station is about as large as the *mean periodic range* at that station.[1]

The mean periodic amplitude is shown by a curve of monthly values, and this curve becomes flatter with elevation above sea-level, since the summer rains diminish and the winter rains increase with altitude. On those portions of the rainfall map of Germany, where 50 per cent of the rainfall at low stations occurs in the colder half of the year, we have only to ascend a short distance in order to find an inversion in the curve of annual rainfall due to the influence of the mountains, and to the fact that our stations are high enough up to allow us to recognize the existence of this phenomenon. In the German mountains, the winter rainfall is more important on the windward side than at the same level on the leeward side. But there is a plane or altitude above which the annual curve for low stations is inverted; where, consequently, the winter rainfall is more important than the summer. The summits of the eastern mountains of north Germany hardly attain to this level, since the measurements on the Schneekoppe (1603 meters) and other similar mountain tops appear to be too uncertain to fix the value of the winter rainfall. On the other hand, in the western part of north and south Germany the altitude of the plane of inversion is about 500 or 600 meters, but ten years more of observation are still needed to fix the elevation at all precisely. In the Alps, at least on the northern slopes, there seems to be no inversion.

LOCAL RAINS.

Hellmann makes a special study of heavy local rains, of

[1] The difference between extreme values is the *range;* the half-difference is the *amplitude* or the extent of the departure either way from a mean value.

short duration, the so-called "platzregen". In defining an excessive rain he differs entirely from previous European authors (Goodman, Riggenbach, Les) and says: "If, therefore, we would define platzregen we must take account simultaneously of both the duration and the intensity".[8] Hellmann modifies his earlier system of 1891 and states that in the present study he considers only those local rains whose intensity per minute and whose duration are as follows:

No.	Duration.	Intensity per minute.
	Minutes.	*Millimeter.*
1	1 to 5	1.00
2	6 to 15	0.80
3	16 to 30	0.60
4	31 to 45	0.50
5	46 to 60	0.40
6	61 to 120	0.30
7	121 to 180	0.20
8	over 180	0.10

The total number of cases occurring in each of these eight classes in north Germany between 1891 and 1902, as shown by continuous registers (Hellmann-Fuess pluviographs), is as follows:

(1) 1–5 m.	(2) 6–15 m.	(3) 16–30 m.	(4) 31–45 m.	(5) 46–60 m.	(6) 1–2 h.	(7) 2–3 h.	(8) Over 3 h.
91	357	346	167	185	319	123	151

The relation between the mean intensity, i, of each of these groups and the duration of the rain, t, in minutes is exprest approximately by the following empirical formula:

$$i = -0.311 + 3.522/\sqrt[3]{t}.$$

Inasmuch as i is the quotient of the depth of rainfall, h, divided by the time, t, therefore the above formula may be written

$$h = -0.311\, t + 3.522\, \sqrt[3]{t^2}.$$

As this formula corresponds expressly to the intense rainfalls, it represents a boundary line that separates such cases from those extraordinary rains that might be conceived of as possible, but that practically never occur. It becomes, therefore, an appropriate problem for the physical meteorologist to ascertain what physical conditions exist in the atmosphere that impose such a limit or boundary line, or to ascertain what prevents the occurrence of rainfalls more intense and over longer periods of time. A chart of the location of these heavy rains shows that they are fairly evenly distributed over the whole of Germany, but are rather more frequent in drier regions. Moreover, they occur almost exclusively in the summer or warmer half of the year, 80 per cent being in June, July, and August.

A long-continued heavy shower is known both in Germany and in America as a "cloudburst." To this phenomenon Hellmann gives a special definition, namely, "a cloudburst is a shower of at least one hour's duration, whose intensity exceeds the above-defined limits of the heaviest local rains, viz, if the cloudburst lasts an hour, the rainfall must exceed 56 millimeters; if two hours, 69 millimeters; if three hours, 90 millimeters". Hellmann quotes eight such cloudbursts, of which the most remarkable occurred at Berlin on April 14, 1902, when 143 millimeters, or 5.63 inches, fell in the course of three and one-half hours.

With regard to one very interesting question, namely, the geographical extent or the limit that should be assigned to a so-called local rain, Hellmann simply says that we must wait until we have a denser network of pluviographs, and this is true not only for Germany but for the densest networks, as in England and Barbadoes.

[8] The definition of excessive rain as used by the Weather Bureau was modified in the latter part of 1896 so as to take account of both time and intensity. (See Monthly Weather Review, January, 1897, Vol. XXV, pp. 13 and 21.) Doctor Hellmann's system is in substantial agreement with that of the Weather Bureau.—*A. J. H.*

PERIODIC VARIATIONS.

After studying the frequency of precipitation, both diurnal and annual, Hellmann takes up the departure from uniformity which is usually exprest as an average departure per month or per year, and which may be either periodic or nonperiodic. If periodic, then some regularity should be found in the occurrence of successive wet or dry years, months, and days. After thoroly studying the accidental occurrences, Hellmann devotes a few pages to the periodic variations at 21 stations having long records. With regard to the 11-year sun-spot period he says:

> Some authors have denied any connection between rainfall and sun-spot periods, and some believe they have found such, altho these latter do not agree among themselves, since some of them find a maximum of sun spots agreeing with an excess of rainfall and others find the contrary. But these differences in the results may proceed from the fact that solar processes may have very different indirect influences on different parts of the earth. An increase or diminution of insolation in the equatorial zone must modify the energy of the general circulation of the atmosphere, whose consequences will be felt years later and in different ways in the other parts of the globe. Moreover, there will be at every station a direct local influence such that the latter may either agree with or differ from the influence that comes to it from distant equatorial regions. Thus it may happen that at one place the maximum rainfall may agree with the minimum. This idea is confirmed by the fact that in western Europe the wettest and the driest years appear to be delayed as we go northward, so that, for instance, they occur in Scotland one or two years later than in Portugal and southern Spain.

The period 1851–1900 embraces four and one-half sun-spot periods, which Hellmann counts from minimum to minimum, as is done by Hann. The rainfalls for 21 selected stations, exprest as percentages of their respective averages, are now summed up, and the totals representing all of Germany are compared with the relative sun-spot numbers of Wolf and Wolfer.[9] By taking the averages of these percentages and smoothing these by the formula $(a+2b+c)/4$, Hellmann obtains a rather regular series of numbers that indicates a double period of rainfall within a sun-spot period. The principal maximum of rainfall slightly precedes the minimum of sun spots, but the secondary maximum of rainfall coincides with the maximum of sun spots. Similar results have been attained by others, and in order better to understand the physical connection Hellmann repeats the computations for the cold and warm halves of the years 1851–1900, but the results for the two halves of the year are precisely like those for the whole year. The total amplitude of precipitation within the sun-spot period is 8 per cent in summer and 16 per cent in winter, and is therefore much smaller than the irregular variations from year to year.

With regard to Brückner's 35-year period, which was in fact first recorded by Francis Bacon in 1622, apparently as the suggestion of some earlier student, Hellmann states that he finds partial confirmation of its existence. He makes use of 24 series appropriate to this study, beginning with 1816 and ending with 1900. He compiles lustrum averages, exprest in percentages of the average rainfall during the fundamental period 1851–1900, and finds a general maximum of rainfall in the lustrum 1876–1880, and a general minimum in 1861–1865; however, this maximum is not repeated 35 years earlier at many stations, but occurs rather later, namely, 1851–1855. The minimum of 1861 recurs again 35 years earlier, in 1826–1830. Hellmann concludes that these relations between rainfall and possible cosmic influences can not have any practical importance since, when we come down to individual cases, the rules fail as often as they fit. In order to help on such investiga-

[9] These are published in full in the Monthly Weather Review, April, 1902, vol. 30, p. 171.—EDITOR.

tions meteorologists can do nothing better than to secure for the whole earth the longest and most homogeneous series of observations possible.—*C. A.*

A POSSIBLE CASE OF BALL LIGHTNING.

By WILLIAM H. ALEXANDER, Local Forecaster. Dated Burlington, Vt., August 13, 1907.

During the month of July, 1907, the weather in the Champlain Valley, if not in the entire State of Vermont, was characterized by several interesting (not to say abnormal) features. Perhaps the most prominent feature was the large number of violent, and in many cases destructive, thunderstorms that occurred. A considerable number of lives was lost and much valuable property destroyed by lightning. Without doubt one of the most singular, certainly one of the most unusual, electrical phenomena known to the writer occurred at Burlington on the 2d, incident to the passage of a barometric depression from the Lake region to the lower St. Lawrence Valley during the last days of June and the first days of July. The distinctive feature of this storm was the single peal of thunder or explosion attended by what is believed to have been a case of "ball" or "globe" lightning. The "explosion" was so sudden, so unexpected, and so terrific that it startled practically the entire city, and there was a general, spontaneous rush to the window or street to see what had happened.

Effort has been made to obtain from eyewitnesses all observed details of importance relative to the phenomenon, but it appears that altho all heard the sound only a few actually saw anything. Fortunately, however, there were competent and reliable witnesses whose statements are given below in their own words.

Bishop John S. Michaud says:

I was standing on the corner of Church and College streets just in front of the Howard Bank and facing east, engaged in conversation with Ex-Governor Woodbury and Mr. A. A. Buell, when, without the slightest indication or warning, we were startled by what sounded like a most unusual and terrific explosion, evidently very near by. Raising my eyes and looking eastward along College street, I observed a torpedo-shaped body some 300 feet away, stationary in appearance and suspended in the air about 50 feet above the tops of the buildings. In size, it was about 6 feet long by 8 inches in diameter, the shell or cover having a dark appearance, with here and there tongues of fire issuing from spots on the surface resembling red-hot unburnished copper. Altho stationary when first noticed this object soon began to move, rather slowly, and disappeared over Dolan Brothers' store, southward. As it moved, the covering seemed rupturing in places and thru these the intensely red flames issued. My first impression was that it was some explosive shot from the upper portion of the Hall furniture store. When first seen it was surrounded by a halo of dim light, some 20 feet in diameter. There was no odor that I am aware of perceptible after the disappearance of the phenomenon, nor was there any damage done so far as known to me. Altho the sky was entirely clear overhead, there was an angry-looking cumulo-nimbus cloud approaching from the northwest; otherwise there was absolutely nothing to lead us to expect anything so remarkable. And, strange to say, altho the downpour of rain following this phenomenon, perhaps twenty minutes later, lasted at least half an hour, there was no indication of any other flash of lightning or sound of thunder.

Four weeks have past since the occurrence of this event, but the picture of that scene and the terrific concussion caused by it are vividly before me, while the crashing sound still rings in my ears. I hope I may never hear or see a similar phenomenon, at least at such close range.

Mr. Alvaro Adsit says:

I was standing in my store door facing the north; my attention was attracted by this "ball of fire" apparently descending toward a point on the opposite side of the street in front of the Hall furniture store; when within 18 or 20 feet of the ground the ball exploded with a deafening sound; the ball, before the explosion, was apparently 8 or 10 inches in diameter; the halo of light resulting from the explosion was 8 or 10 feet in diameter; the light had a yellowish tinge, somewhat like a candle light; no noise or sound was heard before or after the explosion; no damage was done so far as known to me.

Mr. W. P. Dodds (who was on the south side of the street, in the office of the Equitable Life Insurance Co.) says:

I saw the "ball" just before the explosion; it was moving apparently from the northwest (over the Howard Bank Building) and gradually descending; did not see it at the moment of the explosion, or afterward; no damage resulted so far as known to me.

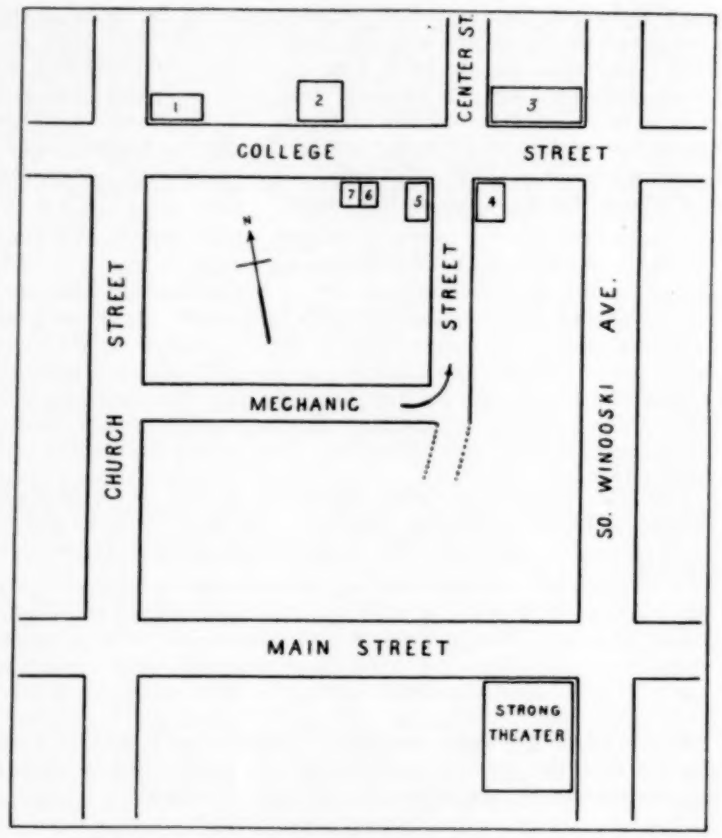


FIG. 1.—Plan of small section of Burlington, Vt., drawn (not to exact scale) to show roughly the several places mentioned in connection with the electric phenomenon of July 2, 1907. 1. Howard National Bank. 2. National Biscuit Company. 3. Hall's Furniture Company. 4. Ferguson & Adsit's store. 5. Dolan Brothers. 6. Equitable Life Insurance Company. 7. Standard Coal and Ice Company.

The following account is taken from the Burlington Daily Free Press of July 3, 1907:

A forerunner to one of the series of heavy and frequent thunderstorms that have characterized the early summer in this vicinity startled Burlingtonians yesterday just before noon. Without any preliminary disturbance of the atmosphere, there was a sharp report, the like of which is seldom heard. It was much louder in the business section of the city than elsewhere, and particularly in the vicinity of Church and College streets. People rushed to the street or to windows to learn what had happened, and when a horse was seen flat in the street in front of the Standard Coal and Ice Company's office it was the general impression that the animal had been struck by lightning and killed. This theory was not long entertained, as the horse was soon struggling to regain his feet. * * *

Ex-Governor Woodbury and Bishop Michaud were standing on the corner of Church and College streets in conversation when the report startled them. In talking with a Free Press man later in the day Governor Woodbury said his first thought was that an explosion had occurred somewhere in the immediate vicinity, and he turned, expecting to see bricks flying thru the air. Bishop Michaud was facing the east and saw a ball of fire rushing thru the air, apparently just east of the National Biscuit Company's building. Alvaro Adsit also saw the ball of fire, as did a young man who was looking out of a window in the Strong Theater Building. Another man with a vivid imagination declared that the ball struck the center of College street near the Standard Coal and Ice Company's office, knocked the horse down by the jar and then bounded up again to some undefined point in the sky. * * * The unusual disturbance was followed in a few minutes by a downpour of rain, which continued, with brief interruption, for nearly two hours.

Another described the sound as "like the tearing of new cambric". All agree that it was the most startling phenomenon of the kind ever experienced, because so unexpected.[1] The "explosion" was followed in a few minutes by a heavy

[1] This "ball of fire" may have been a distant meteor, and it will be worth while to seek for observations by distant observers about noon, Tuesday, July 2, 1907.—EDITOR.

downpour of rain, 1 inch falling in 35 minutes between 12:10 p. m. and 12:45 p. m.

Fig. 1 is a rough plan of a small section of the city of Burlington, and shows the streets, buildings, and stores mentioned by the eyewitnesses; this section is nearly a mile west-northwest of the local office of the Weather Bureau.

STUDIES ON THE PHENOMENA OF THE EVAPORATION OF WATER OVER LAKES AND RESERVOIRS.

By PROF. FRANK H. BIGELOW. Dated June 20, 1907.

I—THE PROPOSED STUDY ON THE PROBLEMS OF EVAPORATION AT THE SALTON SEA, SOUTHERN CALIFORNIA.

The Salton Sea in May, 1907, consisted of a sheet of fresh water, 45 miles long and about 10 or 15 miles wide, containing 440 square miles of surface area, 205 feet below the mean tide level of the Pacific Ocean. This body of water has recently been formed by overflow from the Colorado River and has been protected from further inflow; it will probably dry out in ten or twelve years, so that an unusually fine example of evaporation on a large scale in that arid climate is offered for study. Mr. G. K. Gilbert, of the U. S. Geological Survey, proposed that a preliminary examination be made of the shores of the lake, to see whether the surface inflow and underground seepage can be measured. Subsequently, after several conferences between the representatives of the U. S. Geological Survey, the U. S. Reclamation Service, and the U. S. Weather Bureau, a Board of Conference was sent to the Salton Basin in May, to examine in detail the feasibility of undertaking a campaign on evaporation. A few extracts from reports are here given in order to show that suitable action has been taken to inaugurate such a study of the problems of evaporation on the large scale presented by the drying out of the Salton Sea.

Mr. M. O. Leighton, Chief Hydrographer of the U. S. Geological Survey writes as follows:

(A) NOTES ON THE PRACTICAL VALUE OF INVESTIGATIONS OF EVAPORATION.

Great water supplies in the arid regions must in nearly all cases be the result of conservation of flood waters. This makes it necessary that these waters be stored for long periods in reservoirs with an enormous surface exposure. Such conditions are ideal, especially in hot countries, for maximum loss by evaporation. Loss of water in the arid regions is always a serious factor. It may mean a loss of productivity over large areas of country. It, therefore, becomes a practical question, the importance of which can hardly be overestimated.

In planning reservoirs for the conservation of water, the capacity of the reservoir controls its usefulness; that is, a reservoir of a certain capacity will supply water sufficient to irrigate a certain acreage, to provide municipal supply to a certain population, or to guarantee a certain minimum amount of power. In determining these duties it is obviously necessary to take into account the losses arising during storage. Therefore, in designing a water supply system of whatever kind, it is necessary to deduct from the amount of water available for storage a certain percentage resulting from loss by evaporation. This would be simple if there were at hand any reliable method for computing such losses. Attempts have been made, but it is apparent that the factors secured are erroneous. Therefore it is of the utmost importance to all water supply installation to have the rate of evaporation under fixt and variable conditions determined. A few practical illustrations: It has been estimated that the evaporation in southern Arizona is equivalent to about 6 feet per year. Whether or not this is true we do not know. Assuming, however, that the figure is a fair approximation, the amount of water lost from the Roosevelt Reservoir, surface extent, 16,320 acres, will be 97,920 acre-feet, sufficient to irrigate 48,960 acres, assuming a duty of water equivalent to 24 inches per annum. The same computations may be made with respect to all the great reservoirs in the arid West. It will, therefore, be seen that in computing the area to be reclaimed under the Roosevelt Reservoir it was necessary to deduct nearly 50,000 acres from that which might have been reclaimed had it not been for evaporation. The Sweetwater and Otay reservoirs in the San Diego region in southern California have never performed the duty that was expected of them. Indeed, during the greater part of the time since they were constructed they have been empty or only partially filled. The evaporation from these reservoirs is enormous, and it is highly probable that had there been any worthy information concerning the rate of evaporation at these points it would have been appreciated that the drainage areas would not provide for actual use an amount of water equivalent to the storage installation. In other words, the plans would have been entirely changed and a large amount of money would have been saved.

The above constitute two typical instances of the practical importance of determining all the factors connected with evaporation. If the facts were known, the engineering profession would probably change its ideas with reference to economic depth of water stored, and shallow areas within reservoirs at which it is assumed that evaporation may be greatest would be avoided. If the effects of winds were known, ideas with reference to the proper location of reservoirs would probably be changed, and there would be some useful study and experimentation with reference to the effect of windbreaks, etc. In fact, we can only generalize about the matter, even as it is necessary to generalize with reference to the methods of evaporation study. Each reservoir in the west is subject to great loss. We do not know how much, but it is apparent that did we know subsequent work of this character would be more intelligently carried on.

Appendix B of the report of the Conference Board is given in full as follows (see Chart IX):

(B) MEMORANDUM ON THE IMPORTANCE OF THE PROPOSED INVESTIGATION OF EVAPORATION IN THE SALTON BASIN.

Past and future history of the Salton Sea.

Salton Basin, in the extreme southeastern part of California, is a depression below the level of the sea, its lowest point being 287 feet below mean tide. The basin is separated from the Gulf of California by the delta of the Colorado River. In past time the river has flowed alternately to the gulf and to the basin. Four years ago all the water of the river flowed to the Gulf of California, and the basin was dry. A canal made for irrigation purposes, leading water from the river toward the Salton Basin, became enlarged in time of flood and past beyond control, so that after a few months the entire river discharged to the basin. For more than a year it flowed in that direction, and it was finally brought under control only after strenuous effort. The river has now been returned to its former channel and discharges to the Gulf of California, excepting a small portion employed for irrigation in the Imperial Valley—"Imperial Valley" being the name given to that part of the river delta which slopes toward the Salton Basin.

While the river flowed into the Salton Basin it gradually flooded the lower part of the basin so that now there is a lake or sea about 80 feet deep with a surface area of 440 square miles. As important interests are involved, it may be assumed that the river will be restrained from again invading the basin and that the lake which now exists will gradually dry away, its dissipation requiring between ten and fifteen years.

Need for investigation of evaporation.

In the construction of reservoirs, for whatever purpose, it is necessary to make allowance for evaporation in order to determine in advance what will be the available supply of water. In the work of the Reclamation Service the allowance for evaporation is often very large and affects the plans and estimates of cost in important ways. It is always a factor to be considered in estimating the available supply obtainable from a reservoir of known capacity, and is likewise a factor used in determining the height of a dam of greatest storage efficiency. The exposure of an unnecessarily large area behind a dam of too great height may result in excessive wastage of the supply. Moreover, an inadequate allowance for loss by evaporation from the reservoir surface leads to erroneous assumptions concerning the water which can be made available for useful purposes.

Unfortunately the rates of evaporation for different climates are not well known, so that at present it is impossible to make estimates with desirable precision. It is known that the rate of evaporation in any locality depends on certain factors, namely, the temperature of the air and water, the dryness of the air, and the velocity of the wind; but the nature of the law or formula connecting the evaporation with these factors is not known. Various attempts have been made to determine it, but the results are so discordant that little confidence is felt in any of them. It is known also that a formula for evaporation derived from experiments with a small water surface—such as that afforded by a tank, for example—can not be applied directly to the computation of the evaporation from a reservoir or lake, because the larger bodies are differently affected by the wind. As the air moves across a reservoir and gradually becomes charged with moisture its rate of absorption diminishes, and the average rate of evaporation from a broad surface is therefore less than from a small surface. For this reason the formula for evaporation can not be put on a sound basis without taking account of large water surfaces as well as small. Attempts to measure evaporation from lakes and reservoirs have heretofore been hampered by the difficulty of accurately measuring inflow and outflow so as to discriminate the various factors determining changes in the level of the water surface.

Availability of the Salton Sea.

The conditions afforded by the Salton Sea are peculiarly suitable for the investigation of the laws of evaporation. The amount of water flowing into it is small and can readily be measured. The rainfall is nominal in amount. No water flows out of it. The climate is so dry that the total evaporation in a year will probably amount to 6 or 8 feet. It is therefore possible to determine by gaging the actual rate of evaporation, and to make this determination with high precision. By making the gaging continuous, and by making simultaneous observations of the temperature, atmospheric humidity, wind, etc., the relations of evapo-

ration to these several factors can be made out. It is possible, also, by a suitable arrangement of details and by the use of evaporation tanks, to take account of the relation of evaporation to the size of the evaporating surface.

By reason of the dryness of the local climate, the evaporation rate in the Salton Basin is unusually high. Therefore a formula based on observations at this place will have such range as to be available for all cases likely to arise.

It is especially to be noted that the opportunity given by Salton Sea is both temporary and unique. In ten or fifteen years the sea will have disappeared, and in a somewhat shorter period its waters will become so saline that its rate of evaporation will no longer be normal and representative. It is not to be restored if the resources of the engineer can prevent. Moreover, the combination of physical conditions and events by which the sea was created is so peculiar as to warrant the belief that it is not duplicated elsewhere, certainly not within the United States. Unless use is made of the present crisis in the history of the basin, the opportunity will be lost.

(C) ACCOUNT OF THE WORK OF INSPECTION FROM THE REPORT OF THE CONFERENCE BOARD.

In compliance with instructions received, the undersigned, F. H. Bigelow, representing the U. S. Weather Bureau, G. K. Gilbert, representing the U. S. Geological Survey, and C. E. Grunsky, representing the U. S. Reclamation Service, met at Yuma, Ariz., on May 12, 1907, for the purpose of outlining the scope and methods of an investigation of evaporation in connection with the drying out of Salton Sea, Cal. An organization as a Conference Board was effected by electing F. H. Bigelow chairman, and with all members participating the board was in session from day to day at various places in Salton Basin and held a final session at Los Angeles.

It was recognized in advance that in order to determine the law which controls evaporation and thus utilize to the fullest extent the opportunity afforded by the drying out of the lake, the meteorological conditions at and near the lake must be thoroly investigated; and it was early apparent that financial considerations would make it impossible to install and put in operation at once the fully equipped stations required for this purpose. The board, therefore, has given special consideration, first, to the work which should be immediately undertaken with means now at command, and, second, to scope the work as it should be carried out when suitable financial provision shall have been made.

The board confirms the conclusion reached by the earlier conference committee that the Weather Bureau should direct the making of the observations and should have primary charge of working up results.

Both the Geological Survey and the Reclamation Service should cooperate in the work to the extent found practicable from time to time, and both of these bureaus should remain in close touch with the work. For this reason it appears a wise provision to have the scope of the work and the methods of observation past upon from time to time by this conference board, which should be continued indefinitely for this purpose.

It is foreseen that after the observations have been established on a comprehensive basis, they should be continued without interruption for two or three years; whether for a longer period can not be determined until the results of two years' observations become available.

The board desires to express its appreciation of the preliminary work done in connection with this subject by the U. S. Geological Survey, which, upon a first suggestion that such a study should be made, at once ordered an examination by W. F. Martin, whose exploration of the shores of the sea and of the conditions of run-off from the surrounding country greatly simplified our own investigations. The board found it necessary, however, to have personal knowledge of the physical condition of the country surrounding the large body of water, and also to know something of the conditions which led to the formation of the lake, and to understand the present situation at the Colorado River, which, if modified, may affect the accession to the waters of Salton Sea. Consequently an inspection was made of the works which turned the Colorado River back into its proper channel, and of the levees extending some ten miles beyond the lower Mexican heading which is intended to reduce the annual overbank flow toward the west and north.

The board visited the margin of the sea at its southern extremity, and at several points on the east and northeast along the line of the Southern Pacific Railroad, notably at Durmid and at Salton. Inquiry and personal investigation were also made of the suitability of Yuma, Mammoth Tank, Brawley, Mecca, Indio, and Edom as stations for the meteorological observations required in connection with the direct observation of evaporation and with the study of the effect of a large body of water upon the rate of evaporation.

The control of the Colorado River.

The ancient Gulf of California extended about 150 miles farther north than the present Gulf, filling the entire valley between the two mountain ranges on the east and west. The inflowing waters of the Colorado River, carrying much sediment, gradually pushed a wide delta across this arm of the sea, cutting off the northern portion of the basin, and isolating it. The courses of the river on the top of its delta-divide have been uncertain and shifting, so that the water seeks to flow at times to the Salton Basin and at other times to the Gulf, thus spreading the silt over wider areas. The Salton Sea has been subject to drying out and refilling many times, according to the temporary course of the river. The bottom of the Salton sink is 287 feet below sea level, and Volcano Lake on the top of the delta is 30 feet above sea level, so that the gradient of water flow from the river to the basin is very much greater than it is to the Gulf. Therefore, the Salton inflows are very rapid and powerful, tending to cut thru the delta deposits and transport large masses of soil into the lower levels. In the interests of irrigation in the Imperial Valley, in 1891, a small channel was cut from the Colorado River into the bed of the Alamo River; but, this proving to be insufficient, a second heading was made a little below the first heading, both of these being just below Pilot Knob and north of the Mexican boundary line. In 1903–4 a third heading in Mexican territory, four miles from the boundary, was made, but in the summer of 1904 this channel was worn away too much by the Colorado River, which began to pour down in immense volume and to construct for itself a new channel toward the Salton sink. Great destruction was caused along the Alamo and New rivers, and the irrigation interests of the entire Imperial Valley were threatened. The rising waters made it necessary for the Southern Pacific Railroad to move its tracks three times. It is estimated that the fate of 700,000 acres of fine irrigable land in a semi-tropical region, the homes of 12,000 to 15,000 people, and 150 miles of railroad track, all worth $100,000,000 at an undervaluation, were trembling in the balance. Several serious efforts were made in 1906 to turn back the river to its old channel, with apparent success on November 4. Within four weeks after that date the water worked around the end of the dams; but the attack upon the river was renewed again with great vigor, and at the cost of several millions of dollars, on February 11, 1907, the levees were secured, so that in May they seemed to be very strong and capable of withstanding the June floods which would test their stability. A railroad track is laid on the northern levee for 12 to 15 miles below the permanent heading constructed of concrete and with hydraulic gates, and every effort will be made to preserve the levee intact this year as far as constructed. It is proposed to extend this substantial dike across the delta region till it terminates on the foothills of the Cocopah Mountains on the western side. In case this levee holds, the Salton Sea will evaporate in ten or twelve years, contracting in area from 440 square miles, thus giving a succession of lakes of different sizes. It is immediately in contact with irrigated territory on the north side from Mecca to Indio, where are located the "Government Date Farms"; also on the south side, from Brawley to Calexico, there is an irrigation district covering 400 square miles; beyond these semi-arid districts is the pure desert, one station being available at Edom on the north and one at Mammoth Tank on the south. By the courteous cooperation of the officials of the Southern Pacific Railroad, represented by Mr. R. H. Ingraham, the Division Superintendent at Los Angeles, it is proposed to establish desert stations at Edom and Mammoth Tank; irrigation stations at Indio, Mecca and Brawley; and lake stations, one at Salt River, where there is a long trestle bridge crossing an arm of the sea about 40 feet deep, and another on a large raft anchored in the middle of the Salton Sea, as near as practicable to the point of zero-node of oscillation due to the wind action. The prevailing winds are from the northwest or from the southeast, as guided by the large mountain ranges, so that the evaporating atmosphere over the chain of stations will undergo conditions subject to reversals of meteorological values, and thus afford the means to differentiate the terms in the formula of evaporation, which it is designed to procure from the general re-

search. The work of the first year will consist of a preliminary study of evaporation at Reno, Nev., where Professor Bigelow will locate with a small party; in October it is designed to open the chain of stations in the Salton Basin, all working with simple apparatus, intended to give a birds-eye view of the scientific aspects of the problem. During the second year, beginning July, 1908, the complete program will be inaugurated in charge of a physicist in the field, and conducted on the best basis known to science, both as to instruments and thermodynamic theory.

The need for further research into the theory of evaporation in the open air.

OBSERVATIONAL.

There have been several important and extensive researches into evaporation phenomena such as exist over lakes and reservoirs in different climates, wherein attempts have been made to arrive at a general formula to express the results of the observations upon the amount of evaporation, in terms of several simple arguments.

(1) *Russell* (1887–1888):

$$E, \text{ inch/month} = \frac{30.00}{B}\,[43.88\,(e_1 - e_d) + 1.96\,e_1],$$

where e_1 is the vapor pressure at the temperature of the wet-bulb thermometer, and e_d the vapor pressure at the dew-point temperature.

(2) *Abbassia* (Egypt):

$$E, \text{ mm./month} = 8.8(e_w - e_d)\,(1+0.0239\,k),$$

where e_w is the vapor pressure at the water-surface temperature, and k is the velocity of the wind in kilometers per hour.

(3) *Fitzgerald* (Boston, 1876–1887):

$$E, \text{ inch/day} = 0.3984\,(e_w - e_d)\,(1 + 0.0208\,w_1),$$

where w_1 is the wind movement per day.

(4) *Carpenter* (Fort Collins, 1887):

$$E, \text{ inch/day} = 0.3868\,(e_w - e_d)\,(1 + 0.0025\,w_1).$$

(5) *Stelling* (Russia, 1875, 1882):

$$E, \text{ mm/2 hours} = 0.0702\,\Sigma\,(e_w - e_d) + 0.00319\,\Sigma(e_w - e_d)\,w,$$

where $\Sigma\,(e_w - e_d)$ is the sum of 12 readings made every two hours.

It is seen that all but Russell use the formula known as Dalton's Law, whose form is,

$$(6) \qquad E = \frac{dv}{dt} = A\,(e_w - e_d)\,(1 + c\,k),$$

the arguments being the temperatures of the water surface and the dew-point of the atmosphere, together with the movement of the wind. Reducing Abbassia, Fitzgerald, Carpenter, and Stelling to a common form and standard units, in order to give the evaporation in millimeters per hour, using v, the wind velocity in meters per second, we have:

(7) *Abbassia:*

$$E, \text{ mm./hour} = 0.0122\,(e_w - e_d) + 0.00029\,(e_w - e_d)\,v.$$

(8) *Fitzgerald:*

$$E, \text{ mm./hour} = 0.0166\,(e_w - e_d) + 0.000783\,(e_w - e_d)\,v.$$

(9) *Carpenter:*

$$E, \text{ mm./hour} = 0.0161\,(e_w - e_d) + 0.0000895\,(e_w - e_d)\,v.$$

(10) *Stelling:*

$$E, \text{ mm./hour} = 0.0351\,(e_w - e_d) + 0.00044\,(e_w - e_d)\,v.$$

An inspection of the constants shows that altho these formulas may represent the local rates of evaporation, the formulas can not be considered sufficiently general to be of use in localities where the constants have not been especially determined. To illustrate the results to be obtained by using these formulas on the same example, we have computed the hourly amounts of evaporation per hour by assuming, in the centigrade system,

$t_w = 23.9$ C.°, $e_w = 22.02$, (by the Smithsonian Tables),
$t_d = 15.6$ C.°, $e_d = 13.17$,
$v = 10$ meters per second. Hence, $e_w - e_d = 8.85$ mm.

Abbassia:

$$E, \text{ mm./hour} = 0.1080 + 0.0257 = 0.1337.$$

Fitzgerald:

$$E, \text{ mm./hour} = 0.1469 + 0.0693 = 0.2162.$$

Carpenter:

$$E, \text{ mm./hour} = 0.1425 + 0.0079 = 0.1504.$$

Stelling:

$$E, \text{ mm./hour} = 0.3106 + 0.0389 = 0.3495.$$

The agreement is so unsatisfactory as to suggest that the formulas have not a comprehensive form, and that the so-called constants determined empirically are in reality variable to a considerable extent.

THEORETICAL.

There are several thermodynamic theories of evaporation, such as are collected in Vol. II of Weinstein's Thermodynamics, 1905, of which Stefan's is the most suggestive. He assumes the very special case of a tube, wherein the vapor pressure is maintained at $e=0$ at the top of the tube, while diffusion is proceeding from the water surface at the distance h below the top. If n is the total number of air and vapor molecules in a thin layer dh at the surface of the water, containing N_1 vapor molecules, and $(n-N_1)$ air molecules, so that N molecules diffuse into air from the water, the velocities being u_1 and u_2, respectively, for vapor and air molecules, we have the equations of steady condition of the thin layer,

$$(11) \qquad n_1 u_1 = (N_1 - N)\frac{dh}{dt}, \text{ for vapor moving from the water,}$$

$$(12) \qquad n_2 u_2 = (n - N_1)\frac{dh}{dt}, \text{ for air moving toward the water,}$$

$$(13) \qquad n_1 u_1 + n_2 u_2 = (n - N)\frac{dh}{dt}.$$

The common equation for diffusion is,

$$(14) \qquad \frac{\partial u_1}{\partial t} = D\frac{\partial^2 n_1}{\partial x^2},$$

where D is the coefficient of diffusion, and x is the distance along the central axis of the tube.

Stefan applies this to his assumed tube and its conditions in the form,

$$(15) \qquad \frac{\partial u_1}{\partial t} = D\frac{\partial^2 n_1}{\partial x^2} + \frac{N-n}{n}\frac{\partial n_1}{\partial x}\frac{\partial h}{\partial t},$$

and finds the approximate solution,

$$(16) \qquad h^2 = \frac{nD}{2N}\log\frac{n}{n-N_1}\cdot t.$$

Since the densities are $\rho = Nm$, $\rho_1 = nm = \rho_0\frac{p}{p_0}\frac{T_0}{T}$,

$$(17) \qquad h^2 = \tfrac{1}{2}\frac{\rho_0}{\rho}\frac{T_0}{T}\frac{p}{p_0}\,D\log\frac{p}{p-p_1}\cdot t.$$

This form is so far irreconcilable with Dalton's simple law, that Weinstein remarks that Dalton's Law is entirely unsatisfactory. Therefore we must conclude that a complete research is needed, not only to determine the thermodynamic formulas under general conditions, especially such as prevail in the open, where the diffusion lines are so seriously interfered with and distorted by the movements of the wind. The subject is far too complex to take up at this time, but it may be well to indicate some facts regarding its treatment in general.

The general theory of evaporation.

There are two processes taking place in the case of evaporation, namely, (1) the transformation of water in the liquid state into the same water in the vapor state, and (2) the diffusion of this gaseous vapor into the atmosphere, which already contains a certain quantity of vapor. The first process is confined to a very thin layer adhering to the water surface, and the rapid removal of this film by the wind accelerates diffusion.

The gradients of diffusion are nearly discontinuous at this film, change rapidly in the first few millimeters, and then slowly up to great heights. The wind velocity from the surface up to 10 meters is an important function to be determined; the distribution function under the action of the wind is a very complex and difficult one to determine in the open air over a lake swept by variable wind currents. The limited amounts of the diffusion involve the reasons why natural air is usually saturated to only 80 per cent of its total capacity, or, vice versa, why it is so hard to dry out the last few per cent of vapor from a mixt atmosphere. Then, too, nearly all the difficulties arising from the fact that the constants required in the kinetic and thermodynamic computations are not very accurately known enter this problem with great persistency, so that many intricate physical investigations are suggested as advisable at the outset. In order to illustrate these remarks a little more fully I will extract from my computations some data applicable to the case of the atmosphere with as few remarks as possible on this occasion. Since the Boyle-Gay Lussac Law, $Pv=RT$, is at the basis of the kinetic theory of gases and the thermodynamics of gases, it follows that each of these theories is interconvertible whenever desired in discussions.

I. By converting a certain volume of water, v_2, in cubic centimeters, into vapor at a given temperature, T_1, and pressure, P_1, we get, by Clayperon's formula, the volume v_1, using r_1 the latent heat of vapor, and A, the mechanical equivalent of heat.

$$(18) \qquad v_1 = v_2 + \frac{r_1}{AT_1}\frac{dT_1}{dP_1}\frac{41855000 \times 760}{1013240}.$$

TABLE 1.—*Volume changes of water to vapor at different temperatures.*

t	centigrade	0°	10°	20°	30°	100°
T	absolute	273	283	293	303	373
r_1	latent heat	606.5	599.4	592.3	585.3	535.7
$\frac{dP_1}{dT_1}$	gradient	0.33	0.61	1.07	1.81	27.20
v_1	volume	211356	109006	59312	33507	1659

One cubic centimeter of water is converted into v_1 cubic centimeters of vapor at the temperature t. If a surface of water is lowered 1 centimeter by evaporation, the volume of vapor, v_1, is to be disposed of by diffusion into and mixture with the dry air, or with air already partly mixt with aqueous vapor. Diffusion in the several strata above the surface, at the heights 1, 2, 3.....h centimeters, goes on at very different rates when the air is calm, and this function must be discovered. When these strata are set into commotion by the movements of the wind over the water surface there is added a factor or function for mixture that is of great complexity. The formula for the weight in grams of the water contained in 1 cubic centimeter of air in the state of saturation at the temperature t is given by

$$(19) \qquad \sigma = \sigma_0 \times 0.622 \frac{T_0}{T}\frac{e_s}{Bn},$$

where $\sigma_0 \times 0.622 = 0.00129305 \times 0.622 = 0.0008043$,
$\frac{T_0}{T} = \frac{1}{1+at}$, e_s is the vapor pressure of saturation, and
$Bn = 760$ millimeters. For the same temperatures as in Table 1 we have:

TABLE 2.—*Reciprocal relations between the formulas (18) and (19).*

e_s	vapor pressure	4.57	9.14	17.36	31.51	760.00
σ	density	.000004836	.000009230	.000017116	.000030040	.000588471
$\sigma v_1 = 1$		1.0222	1.0171	1.0152	1.0065	0.9761
R	gas constant	3539	3520	3514	3484	3380

It is seen that v_1 derived from Clayperon's formula and σ derived from the Smithsonian Tables are nearly reciprocals, the slight imperfections between these systems, one theoretical and the other experimental, indicating that the exact balance among the numerical quantities has not yet been obtained.

II. To illustrate the kinetic theory of gases in this connection, the following data for several gases have been compiled into a homogeneous system for the standard conditions (see Table 3). Departures from the standard values of pressure, $P = 760$ mm., and temperature, $T = 273°$, must be computed in auxiliary tables, in order to follow along the fluctuating conditions of the atmosphere. Take $\frac{1}{A} = 41852800$,

Pressure, $P = B_n \rho_m g_0 = 76 \times 13.5958 \times 980.6 = 1013235$,
Absolute const. $K = Pm_0/\rho_0 T = 1013235 \times 2.00/0.000090 \times 273 = 8248111$.

As to the value of the specific heat at constant pressure c_p and the specific heat at constant volume C_v, their difference $C_p - C_v = R$, and their ratio $C_p/C_v = k$, a collection was made of the measurements of these quantities, as given by many authorities. A mean value of C_p was adopted, and C_v, k were computed by using R as determined by the formula $R = K/m$. Then these values of C_v were reduced to heat units in calories and compared with the values given by laboratory measurements. The agreement was satisfactory for all gases except CO_2, where C_v seems to be too large, that is 0.1720 instead of 0.1666, and k too small, that is 1.2617 instead of 1.3022. Carbonic dioxide is usually anomalous in its action, and the discrepancy is probably due to some peculiarity of its constitution. The measured values were adopted for CO_2. With these values of C_v the coefficient of heat conduction is computed, using Maxwell's constant, 1.667. The diffusion constant is computed for air and aqueous vapor as a pair, with the result, $D = 0.1616$.

III. The next steps in the solution of the diffusion problem are much more complicated, because they involve the evaluation of the differential equations whose integration is possible only in simple particular cases, and then only by the use of a Fourier Series. The mathematical analogy between the flow of heat and the distribution of heat on the one hand, and the flow of evaporation products in stream lines with their equipotential gradient surfaces on the other, seems to be complete. In the case of evaporation the solutions become unusually complex by reason of the action of the wind disturbing the positions of the stream lines and the potential surfaces, in so irregular a manner as to render the usual solutions of the equations under the assigned limiting conditions inapplicable. The equations can probably be modified for practical work as soon as experiment gives some knowledge of the magnitude of the constants involved, and this it will be necessary to learn by actual observations in the field.

For the equipotential surfaces in two dimensions where one end of a tube, with impervious sides, has an evaporating fluid, we have equations of the form,

$$(20) \qquad \frac{d^2u}{dx^2} + \frac{d^2u}{dy^2} = 0,$$

whence

$$(21) \qquad u = \frac{4}{\pi}\left[e^{-y}\sin x + \tfrac{1}{3}e^{-3y}\sin 3x + \tfrac{1}{5}e^{-5y}\sin 5x + \ldots\ldots\right].$$

For the flow of evaporation from a surface, as from the ocean to the air, where the flow is at right-angles to the surface, we have,

$$(22) \qquad du = D\frac{d^2u}{dx^2}.$$

$$(23) \qquad u = \frac{1}{\sqrt{\pi}}\int_{-\infty}^{\infty} f(x + 2a\sqrt{t}\,.\,\beta)\,e^{-\beta^2}\,d\beta,$$

where

$$\beta = \frac{\lambda - x}{2a\sqrt{t}}, \text{ and } \lambda = (x + 2a\sqrt{t}\,.\,\beta).$$

TABLE 3.—*Formulas and constants from the kinetic theory of gases.*

Formulas.	Air.	Aqueous vapor. (H_2O)	O_2	N_2	CO	CO_2	H_2
m = molecular weight	28.735	17.88	31.76	28.02	27.88	43.76	2.00
$\rho = Pm/TK.$ = density	.00129305	.0008046	.0014292	.0012509	.0012546	.0019691	.0000900
$R = K/m.$ = constant	2870330	4613000	2597000	2943600	2958430	1884830	41240000
Check $Pv = RT.$	This check is complete for each gas.						
$n = \rho/m = B/KT = 2h^3P.$	.000046	Constant for the series.					
$q^2 = 3P/\rho$; whence the velocity $q =$	48486	61466	46119	49100	49223	39290	183779
$\gamma^2 = \frac{8}{3\pi}q^2$; whence the velocity $\gamma =$	44669	56629	42489	45237	45350	36198	169320
$h = 3/2mq^2.$	Is a constant parameter. 0.000000000022204						
η = coefficient of friction	.000172	.000097	.000191	.000167	.000167	.000145	.000084
$l_{max} = \eta/0.30967\ mn\gamma.$	.00000962	.00000688	.00001018	.00000945	.00000948	.00000657	.00001780
$\nu = \gamma/l$, number of collisions	4645×10^6	8237×10^6	4175×10^6	4784×10^6	4784×10^6	5510×10^6	9512×10^6
$Q = 1/4\sqrt{2}\ l$, square surface	18383	25714	17364	18696	18650	26910	9931
$\bar{v}$ = coefficient of contraction	.00190	.00282	.00182	.00219	.00186	.00293	.00203
$s = 6\sqrt{2}\ l\ v$, diameter	155×10^{-9}	165×10^{-9}	157×10^{-9}	176×10^{-9}	186×10^{-9}	163×10^{-9}	306×10^{-9}
$n = 6\ v/\pi\ s^3$, number	97×10^{16}	121×10^{16}	89×10^{16}	77×10^{16}	69×10^{16}	128×10^{16}	13×10^{16}
$l_{max}.\ \sqrt{2}\ \pi\ s^2\ n = 1$. path	This check is complete for each gas.						
$L = 1.667\ \eta\ C_v$ = coeff. of conduction.	484×10^{-7}	582×10^{-7}	496×10^{-7}	483×10^{-7}	484×10^{-7}	403×10^{-7}	3392×10^{-7}
D = coefficient of diffusion	0.1616						
C_p = specific heat at constant p (In C. G. S. units.)	9935000	19813200	9115500	10203500	10232900	9082000	142633333
C_v = specific heat at constant v (In C. G. S. units.)	7065000	15196800	6516430	7261333	7274000	7198667	101390700
$R = K/m = C_p - C_v$ (In C. G. S. units.)	2870000	4616400	2599070	2942167	2958900	1883333	41242633
$k = C_p/C_v$	1.40625	1.3038	1.3989	1.4052	1.4068	1.2617	1.4067
C_p = specific heat at constant p (In calories.)	0.2374	0.4734	0.2178	0.2438	0.2445	0.2170	3.4080
C_v = specific heat at constant v (In calories.)	0.1688	0.3631	0.1557	0.1735	0.1738	0.1720	2.4276
$R = K/m = C_p - C_v$ (In calories.)	0.0686	0.1103	0.0621	0.0703	0.0707	0.0450	0.9854
$k = C_p/C_v$ (In calories.)	1.4063	1.3038	1.3989	1.4052	1.4068	1.2617	1.4067
C_v by experiment						0.1666	
k by experiment						1.3022	

In case there is leakage to the sides an additional term is required, for example, to allow for the wind effect, of the form,

$$\frac{du}{dt} = D\frac{d^2u}{dx^2} - b^2u. \tag{24}$$

$$u = \frac{e^{-b^2t}}{\sqrt{\pi}}\int_{-\infty}^{\infty} f(x + 2a\sqrt{t}.\beta)e^{-\beta^2}d\beta. \tag{25}$$

If there is a restriction to the flow, in the nature of a conductivity of heat, of which there are many evidences in evaporation, we have a second differential equation to incorporate with the first, something like the following:

$$\frac{du}{dx} + L(u - \theta) = 0, \tag{26}$$

where L is the coefficient of conduction, and θ the temperature of the air in the neighborhood of the water surface.

The preliminary study at Reno, Nev.

It is with the hope of securing a more intelligent view of the problem that some preliminary observations are to be undertaken in July, August, and September, 1907, at Reno, Nev., by means of which the program for the Salton Basin can be suitably prepared for beginning that work in October. The meteorological tables show that in summer the Reno district, to the east of the Sierra Nevada Mountains, is very favorable for excessive evaporation, without the discomfort of abnormally high summer temperatures, such as occur in the Salton Basin. This can be seen by a few extracts collected in Table 4.

TABLE 4.—*Comparison of the meteorological conditions near the Salton Sink, with those in western Nevada.*

(Reno, Nev., is 4533 feet above sea level.)

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
MEAN MAXIMUM TEMPERATURE.	°	°	°	°	°	°	°	°	°	°	°	°
Yuma	66	72	78	85	93	101	106	104	100	87	76	68
Mammoth	71	78	81	82	92	107	110	108	101	92	81	75
Indio	.....	76	77	106	105	110	113	108	101	90	.....	.....
Carson City (Reno.)	44	48	53	61	67	76	84	84	75	65	56	46
MEAN MINIMUM TEMPERATURE.												
Yuma	42	46	50	55	61	68	77	77	70	58	49	44
Mammoth	39	47	48	48	50	64	74	78	67	62	48	46
Indio	.....	45	52	49	56	81	81	79	70	67	.....	.....
Carson City (Reno.)	22	25	30	35	41	46	52	50	44	35	28	23
HIGHEST TEMPERATURE.												
Yuma	81	91	100	107	112	117	118	115	113	108	92	83
Mammoth	88	87	92	98	108	118	119	124	113	108	97	88
Indio	83	90	94	110	113	116	125	116	112	109	98	81
Carson City (Reno.)	63	68	74	82	88	93	100	100	92	85	74	67

TABLE 4.—*Comparison of the meteorological conditions, etc.*,—Continued.

LOWEST TEMPERATURE.

Stations.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	°	°	°	°	°	°	°	°	°	°	°	°
Yuma	22	25	31	38	44	52	61	60	50	41	31	24
Mammoth	27	38	40	32	40	52	60	52	52	53	28	25
Indio	23	38	39	42	43	62	69	67	48	40	28	20
Carson City (Reno.)	−22	−14	10	16	22	27	35	34	18	17	7	− 7

MEAN PRECIPITATION.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
Yuma	0.40	0.50	0.30	0.10	T.	T.	0.10	0.30	0.10	0.20	0.30	0.40
Mammoth	0.00	1.40	T.	1.40	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.30
Indio	0.30	1.20	1.45	0.20	0.00	0.00	0.00	0.50	0.00	0.00	0.75	1.00
Carson City (Reno.)	2.56	1.49	1.33	0.87	0.61	0.43	0.17	0.13	0.28	0.41	1.50	2.19

RELATIVE HUMIDITY AT CARSON CITY.

75th meridian time.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	%	%	%	%	%	%	%	%	%	%	%	%
8 a. m.	80	81	77	71	70	60	56	61	63	71	75	74
8 p. m.	65	71	56	35	41	29	26	30	31	40	55	50

The expedition to Reno, Nev., is being furnished with some improved pieces of apparatus, constructed by the cooperation and devices of Prof. C. F. Marvin, U. S. Weather Bureau, and embodying some suggestions furnished by Mr. Lyman T. Briggs, U. S. Department of Agriculture, and Mr. Edgar Buckingham, Bureau of Standards. These include a measuring micrometer for differential changes in the level of a water surface, an electrical device for maintaining a fixt surface level and measuring the cubic contents of evaporated water, an improved Piche evaporimeter, an anemometer transformed for reading wind velocities in kilometers per hour instead of miles per hour. The evaporating pans and the auxiliary contrivances, such as towers for the equipotential surfaces, tubes for the Stefan formula, and so on, will be constructed at Reno.

Prof. F. H. Bigelow and Mr. H. L. Heiskell go to Reno from Washington, D. C, and will be assisted there by Mr. Harry O. Geren, Section Director, and such further assistants as may be found necessary in reading the thermometers and other pieces of apparatus.

TORNADO AT PARKERSBURG, W. VA.

[Compiled from reports furnished by H. C. Howe, Section Director.]

On the afternoon of Monday, July 22, 1907, a small tornado past over Belpre, Ohio, and Parkersburg, W. Va., two places situated directly across the Ohio River from each other. The windstorm struck Parkersburg at 5:26 p. m., seventy-fifth meridian time, and lasted about three minutes. It came very suddenly and was accompanied by a loud roaring noise. Observers along the river front or at vantage points state that a funnel-shaped cloud, dark gray in color, suddenly shot down from the black clouds overhanging the city, and that the small end of this cloud traveled very near the ground and rotated rapidly. Lightning accompanied the storm, but no vivid flashes were seen. The rainfall was light and no hail was observed.

The storm moved from the northwest to the southeast. Its track could be traced for about one and one-fourth miles, but the greatest width was only about three hundred feet. The southern limit of the storm past two blocks north of the local office of the Weather Bureau in Parkersburg. By the meteorograph record at the office the wind from 5:27 to 5:28 p. m. blew at the rate of 54 miles per hour, but for a 5-minute interval the mean velocity was only 39 miles per hour; the direction was northwest, tho previous to the storm it had been southwest. The pressure, as shown by the barograph, rose suddenly one-tenth of an inch, from 29.85 to 29.95 inches (sea-level).[1] The temperature at 4:30 p. m. was 92°; at about 5:25, 90°; but at 6:00 p. m. it had fallen to 67°. The recorded precipitation amounted to 0.24 inch.

In addition to the statements of observers that the cloud had a whirling motion much may be judged as to the character of the storm from a study of the débris. Nearly all the trees and tops of trees fell toward the north or northeast, and one roof that was removed was thrown toward the north. Windows were broken on the north sides of buildings. One tree standing near the east side of a house was broken down and another tree was apparently twisted off. In Belpre a small house, about forty feet long, sixteen feet wide, and a story and a half high, was blown from its foundation, which consisted of brick piers rising about three feet above the ground. The house was moved about fifty feet in a northeast direction, turned nearly one-quarter round, and completely wrecked. An outbuilding which had stood about forty feet northwest of the house was blown some distance in a nearly opposite direction (southwest).

No lives were lost, but two persons were slightly injured in the wrecking of the house at Belpre. Several smokestacks and roofs were blown off their buildings. Some trees were destroyed by being uprooted or broken off near the ground, and many other tree tops were damaged. Considerable damage was done to telephone wires, but the total pecuniary loss from the storm is estimated at only $5000.

AUSTRALIAN CLIMATOLOGY.

Pending the reorganization of the federal department of meteorology for all Australia the individual state governments still continue their meteorological publications, and we recently received from the meteorological department of the Sydney Observatory several sets of charts illustrating the general characteristics of the meteorology of this continent. Among these charts we note the following:

(1) The weather chart published daily in the Daily Telegraph at Sydney. A few special separate prints of these important charts are struck off for distribution, and they afford the only basis as yet available for meteorologists to study the movements of highs and lows in that region. The highs approach Australia from the southwest and move eastward or northeastward toward the equator. The lows approach from the northwest or west and move eastward or southeastward, that is, away from the equator. The descending air of the highs gives the interior of tropical Australia its characteristic clear, hot, dry, weather, analogous to that of the tropical deserts of Africa, Arabia, Syria, northern India, New Mexico, Arizona, Texas, Peru, Chili, and the California Peninsula. The Australian Continent does not extend far enough south to allow antarctic highs and blizzards to reach its southern latitudes, analogous to those that descend from latitude 60° north into the interior of the United States of America. If such exist they are probably dissipated by the influence of the southern oceans. This great ocean surface not only mollifies the low temperatures of the highs, but by its smoothness allows the formation and maintenance of the steady stream of strong west winds between latitudes 40° and 55° south. These winds are in fact the mechanical representatives of the westerly winds that precede our American highs. The alternations of wind and calm that attend our highs are feebly represented in the Antarctic region, where the wind is more steady and calms are unknown, because of the steady supply of descending air. In forecasting the weather, as is done daily from these Australian maps, one must bear in mind this tendency of highs and lows to be rapidly converted into a long

[1] The rise in station pressure was from 29.20 to 29.30, the station barometer at Parkersburg being 638 feet above sea level.

band of westerly winds, while the easterly winds disappear even more easily a little way south of the southern coasts of that continent.

In general dry air is denser than moist air of the same pressure and temperature. Lines of equal density drawn on the globe show that a unit volume of continental denser air is driven by centrifugal force toward the equator more forcibly than the same volume of oceanic moister air. The interaction of such masses is much more prominent in the Northern than in the Southern Hemisphere, where densities are more equable and every phenomenon is dominated by the great antarctic vortex. Here the air overflowing from the Tropics whirls around the South Pole as at *a* and *b*, fig. 1, descending more slowly than in our Arctic regions. But eventually its temperature falls by radiation more than it warms by descent, and it reaches a low level, where it is at once whirled outward, as at *c* and *d*, thus constituting a great anticyclone in the Southern Hemisphere analogous to the cyclone with cold center in the Northern Hemisphere, as originally explained by Ferrel. The reason why the upper air at *a* flows inward and the lower air at *d* flows outward is that the upper air has a potential density greater than the lower air, since the latter has lost some heat by radiation; hence for the same velocity of rotation around the South Pole the lower air has a larger centrifugal component, and as it flows outward the upper air must descend to take its place. A similar centrifugal force is utilized daily in our drying machines, cream separators, and other devices.

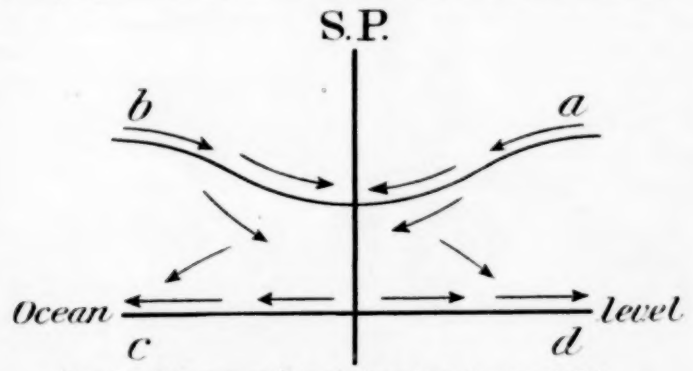


FIG. 1.—The general circulation about the South Pole.

As the air that has descended experiences greater resistance as it flows along over the Antarctic Continent toward *c* and *d* than it did when flowing as upper air from *a* and *b* toward the pole, therefore its velocity is diminished somewhat, and a slight increase in the gradient of pressure toward the equator is produced near the polar region; so that the pressure at sea level in that region is a little higher than in a zone of lowest pressure that must be formed somewhere near the Antarctic Circle.

(2) The four seasonal charts and one annual chart of isotherms and isobars with prevailing winds, and especially the seasonal and annual charts of rainfall with diagrams of monthly and annual temperatures and the rainfall at Sydney, N. S. W., 1840–1906, will tempt many to search for periods and correlations. But we must urge that any such effort be made with full recognition of the internal mechanics of the atmosphere, and not by any purely superficial methods. The latter are too apt to lead to error; the former are more difficult, but are rational and must eventually lead up to important generalizations.—*C. A.*

ELECTRIC SPARK PRODUCED WHEN ICE IS FORMED.

Dr. T. L. Phipson, in his book "Phosphorescence", London, 1862, page 29, publishes the following suggestive paragraph:

A most interesting production of light was observed and published ("Journ. des Sc. Physiques et Chimiques", de M. de Fontenelle) by Professor Pontus, in 1833, who showed that a vivid spark is produced when water is made to freeze rapidly. A small glass globe, terminating in a short tube, is filled with water, the whole is covered with a sponge or cotton-wool imbibed with ether, and placed in an air-pump. As soon as the experimenter begins to produce a vacuum, the ether evaporates, and the sponge or cotton-wool dries, the temperature of the water descends rapidly. But some instants before congelation takes place, *a brilliant spark, perfectly visible in the daytime*, is suddenly shot out of the little tube that terminates the glass globe. M. Pontus has repeated the experiment often, and says that the production of this spark is a sure sign that congelation is about to happen.

The Editor has not been able to obtain the original memoir by Professor Pontus, but if there be no mistake in this experiment and observation then we have here a very plausible explanation of the origin of the lightning that attends hail and thunderstorms in the summer and equally so of the gentler electric discharges attending thunderstorms in winter—possibly also of the still gentler auroral discharge. Will not some one investigate this subject anew?—*C. A.*

THE JAMAICAN WEATHER SERVICE.

By D. T. MARING, Instrument Division, U. S. Weather Bureau. Dated August 1, 1907.

The reestablishment of the weather service for the island of Jamaica, under its own government control, will be welcomed by all interested in meteorology. Tho comparatively small in extent of territory, this island occupies an important geographical and meteorological position in the West Indies, at the northern edge of the Tropics. What might otherwise be a torrid and unbearable climate is completely modified by the lofty mountains of the interior. The healthfulness of the temperate zone is combined with the beauties of tropical scenery, to the delight and admiration of hundreds of tourists who annually land on its shores.

At the time when the general meteorological service of the United States was temporarily extended to embrace all of the West Indies, in 1898, a fully equipped station was established at Kingston, in August of that year. It was found that none of the comparatively low buildings in the business part of the city of Kingston afforded suitable exposures for the Weather Bureau instruments, and it was necessary to locate the station in the residential section of the suburbs. The building selected was a new residence villa belonging to Mr. Humphreys, C. E., situated on the road to the King's House, a short distance above the point known as "Half Way Tree", about 3 miles northwest of the cable office; here the barometers had an elevation of 286 feet above sea level. The exposures of instruments are clearly shown on the accompanying photograph, fig. 1, procured July, 1899, by Mr. C. F. Talman, observer in charge at that time. The observations and records of this station were, of course, placed at the command of all Jamaicans, and shortly afterwards (February, 1899), the local government service that had been maintained for many years, was discontinued. In July, 1903, it became necessary for the U. S. Weather Bureau to discontinue its fully equipped station at Kingston, since which time a special hurricane station only has been kept in operation from July to October of each year. The instrumental equipment of this hurricane station having been wrecked in the earthquake of January, 1907, as shown by photograph, fig. 2, the writer was detailed to proceed to Kingston and reestablish this telegraphic reporting station for the current year. Upon arrival at Kingston the conditions were found to be such as to preclude the possibility of reopening the station, as formerly, in the hands of local operators of the cable company. It was then ascertained that for several years past Jamaican scientists and members of their agricultural society had been agitating the question of restoring their own government weather service. This was felt to be urgently needed, not only for their own climatic studies, but for the benefit of large and growing agricultural and commercial interests involved in the raising and shipping of tropical products to neighboring countries.

Under the liberal administration of the new governor, Sir

Sydney Olivier, K. C. M. G., who takes a personal interest in meteorology and the welfare of everything pertaining to the interests of this beautiful island, the meteorological service is now being resumed. The following special message on this subject, from his excellency the governor, recently submitted to the legislative council, clearly explains the situation:

FIG. 1.—U. S. Weather Bureau office, Kingston, Jamaica, from July, 1898, to July, 1903.

MESSAGE FROM HIS EXCELLENCY THE GOVERNOR TO THE HONOURABLE THE LEGISLATIVE COUNCIL OF JAMAICA.

Honourable Gentlemen:

I have the honour to inform you that I have received a resolution passed by the Jamaica Agricultural Society at their last half-yearly general meeting, inviting the attention of the government to the need for restoration of the meteorological service in this island. I have consulted my Privy Council on this subject and they agree with me in thinking that the time has come when this service should be restored. The meteorological service, which had existed since the year 1880, was from the urgent necessity for economy practically abolished in the year 1899, when it was reduced to the compilation of rainfall statistics, and the total abolition of any separate vote for this latter kind of work occurred in the year 1902 when such work was allotted to the staff of the Island Chemist.

The restoration of the service as it existed for many years would enable us again to have a useful local system of storm warnings together with complete meteorological returns for the capital of this island which, for some years, has had to do without them. It would also enable a revision to be made of the rainfall maps of the island which were prepared some years ago after twenty years registration, but which should now be compiled on the results of some forty years registration. The scheme now proposed would also include a modest time service whereby the correct time could be notified throughout the island from the island telegraph office in Kingston. Other work of a miscellaneous and useful character would from time to time be performed. The chief reason, however, which impels me to suggest to you at this particular time the desirability of the restoration of the weather service is the first one set out above, viz: that we should have an effective system of local storm warnings. At the time of the abolition of the old service the island was fortunate in having had recently established in its midst a well-equipped station with a resident staff supported by the United States Government and the island benefited by the generosity of that Government. Since then that service has been reduced and the staff withdrawn, and in the public interest a local system of storm warnings seems necessary. The value of such a system is of two kinds, one positive, the issuing of notices of approaching cyclones and the other negative, the issuing of notices to dispel false alarms. It has been represented to me that on the occasion of the last cyclone in August, 1903, one firm alone in a seaport town of Jamaica lost in the value of lighters about four times the annual cost of the weather service which it is stated would have been saved if the old weather service with its system of telegraphic warnings throughout the island had then been in existence. Doubtless there are other instances of a like nature within the memory of honourable gentlemen. The dispelling of false alarms is also of great value and is often the means of saving money which would otherwise be needlessly expended.

A resolution will therefore be submitted to you inviting you to vote a sum at the rate of £150 a year for the restoration of the island weather service.

SYDNEY OLIVIER, *Governor.*

KING'S HOUSE, *27th June, 1907.*

FIG. 2.—U. S. Weather Bureau office, Kingston, Jamaica, from July, 1903, to January, 1907. Rear view of building containing offices of the Royal Mail Steamship Company, showing exposures of wind instruments, etc., as wrecked by the earthquake of January 14, 1907.

The resolution mentioned was accordingly promptly presented, past July 3, 1907, and became a law, and the new weather service is therefore assured the desired financial assistance from the colonial government.

Taking advantage of these favorable circumstances, successful negotiations were at once entered into by myself, on

behalf of the Chief of Bureau, with a view to securing cooperation between the Jamaican Service and the United States Weather Bureau. Arrangements were made whereby officials of the Department of Public Works are to make and render the special telegraphic observations required at Washington during the hurricane season, in consideration of the turning over to them of the necessary Weather Bureau instruments and apparatus and the cabling to them of advance information of all hurricanes or violent storms likely to affect their island. This arrangement will, it is believed, prove mutually satisfactory. It also insures for the Weather Bureau the permanence and continuity of meteorological observations at Kingston by trained government officials.

The reorganization of the new Jamaican Weather Service has been placed in the hands of the well known meteorologist, Hon. Maxwell Hall, who formerly had charge of this work, and his knowledge of local needs and conditions insures that the work will be well done. The United States Weather Bureau has cordially agreed to extend all possible cooperation and assistance.

INTERESTING LUNAR CORONA.

By CHARLES MIFFLIN HAMMOND. Dated Upper Lake, Cal., July 29, 1907.

Wednesday evening, July 24, I was watching the lunar eclipse; and just as it was passing off, about 9:30, thin, fleecy clouds began to approach the moon from the southwest. As the point of the bank approached it took on a golden-bronze hue, light close to the moon, and darker at a distance. When the clouds were completely between me and the moon there was a complete circle of this light in diameter about twelve diameters of the moon. The clouds were not thick enough to materially obscure the light of the moon. This golden circle gradually faded away. It was unlike anything I had ever seen before, as it did not in the least resemble the ordinary lunar halo; for it was far smaller and was a solid mass of color, tho decidedly lighter in the center, and at the outer edge it shaded off rapidly almost into black, while the clouds were a fleecy white. I saw in one of the Ukiah newspapers—Ukiah being about 20 miles northwest of us—that the last of the eclipse was obscured by a thick bank of clouds. Undoubtedly they were the same ones I saw, but no mention was made of my observations. I regularly watch the moon when it is up, and have done so for years, and repeat that I never saw anything like this before.

RECENT ADDITIONS TO THE WEATHER BUREAU LIBRARY.

H. H. KIMBALL, Librarian.

The following titles have been selected from among the books recently received, as representing those most likely to be useful to Weather Bureau officials in their meteorological work and studies. Most of them can be loaned for a limited time to officials and employees who make application for them.

Weber, F. Parkes and Hinsdale, Guy.
Climatology; health resorts; mineral springs. In two books. Philadelphia. 1902. ix, [10]–336; x, [11]–420 p. 8°.

Wheeler, W. H.
A practical manual of tides and waves. London. 1906. viii, 201 p. 8°.

Krebs, Wilhelm.
Einige Beziehungen des Meeres zum Vulkanismus. Berlin. 1904. 17 p. f°.

Fernley observatory. Southport.
Report and results of observations. 1906. Southport. 1907. 33 p. 8°.

Koch, Albert.
Das Klima von Hallem vom Saal und Mansfelder Seekreise. Halle a S. 1907. 32 p. 8°.

Norway. Norske meteorologiske Institut.
Nedboriagttagelser i Norge. 1906. Kristiania. [1907] xx, 219 p. f°.

Bologna. Università. Osservatorio.
Osservazioni meteorologiche 1905. Bologna. 1906. 31 p. f°.

Krüger, Friedrich.
Die Niederschlagsverhältnisse und Gewitter in Herzogtum Sachsen-Altenberg 1900–1904. Altenburg. 1905. 33 p. 8°.

Oddone, Emilio.
Quelques constantes sismiques trouvées par les macrosismes. [Strassburg. 1907.] 27 p. 4°.

Altenburg (Germany). Sternewarte.
Die Witterungverhältnisse von Altenburg und Umgegend . . . 1 Juni 1899 bis 31 Mai 1904. Altenburg. 1904. 19 p. 8°.

Hoyt, John C.
Comparison between rainfall and run-off in the northeastern United States. (*In* Proc. Am. soc. of civ. eng. v. 33, no. 5. May, 1907, p. 452–505.)

Ehrhart, Sebald Bernhard.
Die Verteilung der Temperatur und des Luftdruckes auf der Erdoberfläche im Polarjahre 1882–87. Stuttgart. n. d. 35 p. 8°.

Delory, L.
Essai de météorologie. Béthune. 1901. 92 p. 8°.

Fiala, Anthony.
Fighting the polar ice. New York. 1907. xxii, 296 p. 4°.

Chili. Servicio meteorologico de la Direccion del territorio maritimo.
Annuario 1905. Valparaiso. 1907. 402 p. 4°.

Dallet, G.
La prévision du temps et les prédictions météorologiques. Paris. n. d. 336 p. 12°.

Indo-China. Service météorologique.
Carte pluviométrique de l'Indo-Chine 1906. n. p. [1907.] 1 sheet. 60 x 82 cm.
Observation de l'éclipse de soleil de l'Indo-Chine 1906. Hanoi. 1907. 3 p. 4°.

Kozak, Josef.
Meteorologische Beobachtungen. Wien. 1906. vi, 191 p. 8°.

Norway. Norske meteorologiske Institut.
Jahrbuch 1906. Kristiania. 1907. xii, 121 p. f°.

Greenwich. Royal observatory.
Results of the magnetical and meteorological observations 1905. Edinburgh. 1906. v. p. f°.

Haracic, Ambrogio.
L'isola di Lussin. Lussinpiccolo. 1905. 290 p. 8°.

Sweden. Statens meteorologiska Centralanstalt.
Meteorologiska iakttagelser i Sverige. 1906. Uppsala. 1907. x, 157 p. f°.

Prussia. Königliches preussisches meteorologisches Institut.
Ergebnisse der Gewitter-Beobachtungen 1901 und 1902. Berlin. 1907. xliv, 63 p. f°.
Ergebnisse der meteorologischen Beobachtungen in Potsdam 1903. Berlin. 1907. vii, 118 p. f°.

India. Meteorological department.
Memorandum on the meteorological conditions in the Indian monsoon region . . . 1907. Simla. 1907. 7 p. f°.

Bracke, A.
Les curiosités atmosphériques en 1906. Mons. 1907. 96 p. 8°.

Roumania. Institutul meteorologic.
Buletinul lunar 1905. Bucuresti. 1906. 254 p. f°.

Hepites, St. C.
Secetele in România. Bucuresti. 1906. 48 p. 8°.

Hepites, St. C. and Murat, I. St.
Meteorologia si metrologia in România. Bucuresti. 1906. ii, 131 p. 8°.

St. Ignatius college (Cleveland). Meteorological observatory.
Twelfth annual report. Cleveland. 1906–7. 26 p. 8°.

Charcot, J[ean] B[aptiste].
Le "Francais" au pôle sud. Paris. [1906.] xxxvii, 486 p. 4°.

Amery, P. F. S.
Rainfall at Ashburton. (Repr. Trans. Devonshire assoc. adv. sc. 1906. v. 38, p. 82–86.)

Krüger, Friedrich.
Die Bedeutung der Witterungskunde und Wettervorhersage für den praktischen Landwirt. (S.-A. Fühlings Landwirtschaftliche Zeitung.)

Overbeck, —.
Beiträge zur Klimatologie Meissens. (*In* Jahresbericht der Fürsten- und Landesschule St. Afra, Meissen, 1906, p. 1–49.)

Abbe, Cleveland.
The progress of science as illustrated by the development of meteorology. (Repr. Phil. soc. Washington, Bull. v. 15, p. 27–56.)

Seidler, Hermann.
Die Temperaturverhältnisse der Westbeskiden. (*In* Mitteilungen des Beskidenvereins. Bielitz-Biala, 1 Jahrg., 1904, p. 36–43, 51–58.)

Angot, Alfred.
Instructions météorologiques. 4th ed. Paris. 1903. vi, 163 p. 8°.

Journal de physique.
Table analytique et table par noms d'auteurs des trois premières series du Journal de physique 1872–1901. Paris. n. d. xv, 182, 159 p. 4°.

Mandl, Johann, tr.
Preces an repellandam tempestatem. Der Wettersegen nach dem Römischen Rituale. Regensburg. 1906. 16 p. 24°.

RECENT PAPERS BEARING ON METEOROLOGY.

H. H. KIMBALL, Librarian.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the Library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——

American philosophical society. Philadelphia. v. 46. Jan.–Mch., 1907

Barus, C. On distributions of nuclei in dust-free wet air, and on methods of observation. p. 70–79.

Imperial earthquake investigation committee. Bulletin. Tokyo. v. 1. no. 3.

Imamura, A. Note on the direction and magnitude of the vibrations in the different phases of the earthquake motion. p. 125–132.

Omori, F. Earthquake zones in central Japan. p. 133–137.

Omori, F. Recent strong earthquakes in the Shinano-gawa valley. p. 138–140.

Omori, F. Note on the eruptions of the Unsendaké in the 4th year of Kansei (1792). p. 142–144.

Omori, F. Seismograms showing no preliminary tremor. p. 145–154.

Omori, F. Vibrations of a railway bridge pier. p. 155–157.

Imamura, A. On a method of suppressing the air tremors occurring in the Milne H. P. seismograms. p. 158–160.

Physical review. Lancaster, Pa. v. 25. Aug., 1907.

Burbank, J. E. Temperature control of the Cheltenham magnetic observatory, U. S. Coast and Geodetic Survey. p. 115–122.

Royal meteorological society. Quarterly journal. London. v. 33. July, 1907.

Baden-Powell, B. F. S. The exploration of the air. p. 193–199.

—— Rain-making experiments in the Klondike. p. 199–200.

Holmes, R. L. Phenomenal rainfall in Suva, Fiji, August 8, 1906. p. 201–205.

Holmes, R. L. Rainfall at Delanasau, Bua, Fiji, 1906. p. 205–206.

Strachan, Richard. Temperature around the British islands in relation to the Gulf Stream. p. 207–211.

Bonacina, L. C. W. Weather regarded as a function of climate. p. 213–219.

—— Ice and its movements in Baffin Bay. p. 251. [Repr. from Geogr. journal.]

—— Climate of Egypt. p. 257–260. [A good, succinct account of Egyptian climate. Repr. from Egypt. Survey department. Meteorological report for the year 1904.]

—— Hoar frost at high altitudes. p. 261. [Repr. from Geogr. journal.]

Scientific American. New York. v. 97.

Fergusson, S. P. The international kite ascensions. (Aug. 10, 1907.) p. 97–98.

Brownell, Baker. A homemade air thermometer. (Aug. 17, 1907.) p. 118.

Scientific American supplement. New York. v. 64.

Morrison, J. H. St. Swithin's day. (Aug. 10, 1907.) p. 95.

—— Balloons and lightning. Danger for the aeronaut up in the storm clouds. (Aug. 17, 1907.) p. 103. [Repr. from New York Sun.]

Symons's meteorological magazine. London. v. 42. July, 1907.

—— Alexander Buchan. p. 103–106.

Tokyo mathematico-physical society. Proceedings. Tokyo. 2d ser. v. 4.

Nakamura, S. On the seiches in lakes Yamanaka, Kawaguchi, and Hamana. (No. 4. May, 1907.) p. 73–79.

Omori, F. On earthquake zones in central Japan and in the Shinano-gawa valley. (No. 6. July, 1907.) p. 126–131.

Aérophile (L'). Paris. 15 année. Juil. 1907.

Philos. Un nouveau statoscope; suspension nouvelle pour instruments de bord. p. 182–183.

Levée, Ch. Curieux phénomènes électriques vus en ballon. p. 203–204.

Ciel et terre. Bruxelles. 27 année. 1 août 1907.

Dobrowolski, A. Les cristaux de glace aériens et le phénomène des halos. p. 257–267.

L., V. D. L'inclémence de l'été actuel. [Note.] p. 277–278.

France. Académie des sciences. Comptes rendus. Paris. Tome 145. 8 juil. 1907.

Teisserenc de Bort, Léon. Sur la distribution de la température dans l'atmosphère sous le cercle polaire et a Trappes. p. 149–152.

Nature (La). Paris. 35 année. 20 juil. 1907.

Fournier, E. La sécheresse dans le Jura en 1906. p. 119–122.

Revue néphologique. Mons. Juillet 1907.

Shedd, J. C. L'évolution du cristal de neige. p. 145–150.

—— Mirage dans l'Atlantique. p. 150–151.

Société Ramond. Bulletin. Toulouse. 41 année. 3me sér. Tome 1. Juil.-Déc., 1906.

Marsan, Francois. Météorologie ancienne du midi Pyrénéen. Nouvelle série (1243–1871). p. 194–207.

Marchand, E. Observations météorologiques du Pic-du-Midi et de Bagnères-Bigorre. p. 239–246.

Annalen der Physik. Leipzig. 4 Folge. Bd. 23. 1907.

Tangl, Karl. Ueber die Dielektrizitätskonstante der Luft bei hohem Druck. p. 559–574.

Kaiserl. Akademie der Wissenschaften. Sitzungsberichte. Mathematisch-Naturwissenschaftliche Klasse. Wien. 115 Bd. 1906.

Przibram, K. Ueber die Kondensation von Dämpfen in ionisierter Luft. (Jän. 1906.) p. 33–38.

Knoll, Hermann. Ueber landsame Ionen in atmosphärischer Luft. (Feb. 1906.) p. 161–172.

Benndorf, Hans. Ueber gewisse Störungen des Erdfeldes mit Rücksicht auf die Praxis luftelektrischer Messungen. Beiträge zur Kenntnis der atmosphärischen Elektrizität. (Apr. 1906.) p. 425–456.

Daulebsky v. Sterneck, R. Ueber die scheinbare Form des Himmelsgewölbes und die scheinbare Grösse der Gestirne. (Mai 1906.) p. 547–588.

Börnstein, Richard. Die halbtägigen Schwankungen der Temperatur und des Luftdruckes. (Juni 1906.) p. 881–904.

Benndorf, H. Ueber die Art der Fortpflanzung der Erdbebenwellen im Erdinneren. (II. Mitteilung.) (Juni 1906.) p. 941–982.

Conrad, Viktor. Messungen des Ionengehaltes der Luft auf dem Säntis im Sommer 1905. Beiträge zur Kenntnis der atmosphärischen Elektrizität. XXIV. (Juli 1906.) p. 1055–1079.

Exner, Felix M. Grundzüge einer Theorie der synoptischen Luftdruckveränderungen. (Juli 1906.) p. 1171–1246.

Schweidler, E. v. Luftelektrische Beobachtungen am Ossiachersee im Sommer 1906. Beiträge zur Kenntnis der atmosphärischen Elektrizität. XXV. (Okt. 1906.) p. 1263–1284.

Weiss, E. Beobachtungen über Niederschlagselektrizität. Beiträge zur Kenntnis der atmosphärischen Elektrizität. XXVI. (Okt. 1906.) p. 1285–1320.

Kohlrausch, K. W. Fritz. Ueber Radiuminduktion in der atmosphärischen Luft und eine Methode zur absoluten Messung derselben. Beiträge zur Kenntnis der atmosphärischen Elektrizität. XXVII. (Okt. 1906.) p. 1321–1326.

Meteorologische Zeitschrift. Braunschweig. Band 24. Juli 1907.

Schubert, J. Ueber den täglichen Wärmegang im Paarsteiner See. p. 289–295.

Maurer, J. Ueber die Strahlung einer freien Schneefläche in absolutem Masse und die Schneefälle im Winter 1906–7 in der Schweiz. p. 295–300.

Kassner, C. Gewitterschirm und Sonnenringe. p. 301–306.

Bemporad, A. Versuch einer neuen empirischen Formel zur Darstellung der Änderung der Intensität der Sonnenstrahlung mit der Zenitdistanz. p. 306–313.

Woeikow, A. Locarno am Lago Maggiore und Jalta an der Südküste der Krim. Lokalklimatologische Aufnahmen. p. 314–316.

Costanzo, G. and Negro, C. Ueber die Radioaktivität des Regens. p. 317. [Abstract.]

Ruch, Otto. Zerrbilder der Ostalpen im Feldbergpanorama. p. 318–319.

Trabert, W. Zur Messung der Tropfengrösse bei Regenfällen. p. 320.

Schmidt, Wilh. Ueber Luftdruckschwankungen bei Blitzen. p. 320–323.

Köppen, W. Verhältnisse von Frost, Schneedecke und Luftdruck in Norddeutschland im Winter 1906–7. p. 323–325.

Ekholm, Nils. Die Wetterregeln des Herrn H. Guilbert. p. 326–328.

—— Regenfall zu Beira. p. 328. [Collected data 1902–5.]

—— Regenfall in Palästina. p. 331–332.

—— Resultate der meteorologischen Beobachtungen zu Loanda an der tropischen Westküste Afrikas. p. 333–335. [Observations for 1890–91.]

—— Ein japanisches Papier als Hülle fur das nasse Thermometer. p. 335.

Physikalische Zeitschrift. Leipzig. 8 Jahrgang. 1 Aug. 1907.

Rosenthal, Elmar. Ueber die Fortflanzung der langen Erdbebenwellen. p. 510–512.

Wiener luftschiffer Zeitung. Wien. 6 Jahrgang. Aug. 1907.

—— Einfluss der Sonne aus Wetter. p. 161–162.

Weltall (Das). Berlin. 7 Jahrgang. 1907 Juni 15.

Krebs, Wilhelm. Luftdruck-Recorde besonders die grosse Luftdruckschwankung im Januar und Februar 1907. p. 269–275.

Wetter (Das). Berlin. 24 Jahrgang.

Pepler, W. Ueber die Schwankungszentren des Luftdrucks. Juni 1907. p. 121–124.

Klengel, Friedrich. Die Niederschlagsverhältnisse in Deutsch-Südwestafrika. (Juni, Juli 1907.) p. 125–130, 150–156.

Cyran, George. Die Trockenheit des Jahres 1893 in Mitteleuropa. (Juni, Juli 1907.) p. 130–137, 157–163.

Lindemann, —. Temperaturkalender von Chemnitz (1886–1905). Juni 1907. p. 139–141. [Includes daily normals.]

Gerstmann, Heinrich. Zur Frage einer Wetterscheide in den Alpen. (Juli 1907.) p. 145–150.

Hemel en dampkring. Den Haag. 5 Jaahrgang.

Everdingen, D. van. Blikseminslag bij boomen. (Juni 1907.) p. 17–22.

Smits, P. J. Weerkundige waarnemingen te Batavia 1866–1905. (Juni, Juli 1907.) p. 22–26, 33–39.

Hiesink, C. W. De invloed der maan op den neerslag. (Juli 1907). p. 39–42.

Reale accademia dei Lincei. Atti. Serie quinta. Rendiconti, Classe di scienze fisiche, matematiche e naturali. v. 16. 2° sem. 7 luglio 1907.

Ricco, A. L'Osservatorio Etneo in rapporto al servizio meteorologico. p. 25–33.

Mendola, L. and Eredia, F. Secondo riassunto delle osservazioni meteorologische eseguite all'Osservatorio su l'Etna dal 1892 al 1906. p. 34–40.

Bemporad, A. Saggio di una nuova formola empirica per rappresentare il modo di variare della radiazione solare col variare dello spessore atmosferico attraversato dai raggi. p. 66-71.

Società geografica Italiana. Bollettino. Ser. 4. v. 8. Agosto 1907.

Palazzo, Luigi. I brontidi del bacino bolsenese. p. 738–745.

THE WEATHER OF THE MONTH.

By Mr. P. C. DAY, Assistant Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure for July, 1907, over the United States and Canada is graphically shown on Chart VI, and the average values and departures from the normal are shown for each station in Tables I and V.

The general distribution of the mean atmospheric pressure for July showed no marked variation from the normal midsummer type. The relative positions of the more or less permanent areas of high and low pressure, common to the period of the year, were maintained, except that there was a general diminution of pressure over all eastern districts, quite pronounced over New England and the eastern provinces of Canada. Slight excesses of pressure were maintained over the northern Rocky Mountain district, the middle Plateau, the central Pacific coast, and along the Gulf coast.

Over the remaining districts of the United States and Canada pressure averaged below normal, with the greatest deficiency from the Lake region and Middle Atlantic States northeastward over New England and eastern Canada, where the departures from normal ranged from —.05 to —.15 inch.

Low pressure was maintained over the southwest as usual, and the high pressure area over the north Pacific district did not depart materially from the normal, except that it penetrated farther into the northern Plateau and Rocky Mountain districts.

The normal marked rise in pressure over all interior districts from June to July was more pronounced during this year than usual, especially over the Rocky Mountain and Great Plains districts where the increase in pressure during July over the preceding month averaged nearly 0.10 inch. Over both the Atlantic and Pacific coast districts the pressure diminished decidedly from that of June.

The decrease of pressure over the eastern districts with somewhat higher pressure over the northern Rocky Mountain States modified materially the prevailing direction of the surface winds over the districts east of the Rocky Mountains; and instead of normal southerly winds, common to the season, the trend of the winds was decidedly from the west, and in the more northerly districts northwesterly winds prevailed. West of the Rocky Mountains the usual westerly winds prevailed.

TEMPERATURE.

During most of July normal summer temperatures prevailed. No protracted periods of either high or low temperatures occurred, and the monthly mean temperatures showed no marked variation from the average.

Over the South Atlantic and Gulf States, the lower Mississippi Valley, Kansas, and eastern Colorado, along the coast of California, over the whole of Oregon and Washington, and the southern part of New England, the average temperature for the month exceeded the normal by amounts generally less than 2°. From the Lake region westward to and including the Rocky Mountain and Plateau districts, the mean temperature for the month averaged below the normal from 1° to 3°.

The abnormally warm weather over western Texas noted during the last two days of June continued into July, and during the first week of the latter month unusually warm weather prevailed over nearly all portions of the region from Texas westward to and including southern California. The maximum temperatures during this period were generally the highest recorded during the month, and at several points in Arizona and southern California they were as high as or higher than recorded in any previous July. Over the more northern districts, especially the Lake region, Middle Atlantic States, and New England, the first week of the month was decidedly cool, and the minimum temperatures on the 3d and 4th were generally the lowest for the month, and at some points as low as or lower than ever before recorded in July. In exposed places over the northern portions of the above-mentioned districts the temperatures closely approached the freezing point, and light frosts were reported from several localities.

The most prolonged and generally warmest period of the month prevailed from the 15th to the 25th over the interior districts between the Appalachian and Rocky mountains. During this period the temperatures were generally above the normal, with maximum temperatures on the 23d and 24th of 100° or higher over Texas, Oklahoma, Kansas, Missouri, and surrounding districts.

Over the North Pacific States unusually warm weather prevailed during the closing days of the month, with maximum temperatures on the 30th and 31st generally above 100° over nearly all portions of Oregon and Washington.

Maximum temperatures of 90° or higher were recorded over nearly all districts, except the Lake region, the coast of New England, the higher elevations of the Appalachians, over the mountain regions of the west, and along the immediate Pacific coast. Maximum temperatures from 110° to 120° or higher were recorded over southwestern Arizona and southeastern California.

Temperatures below freezing occurred in the mountain districts of Colorado, Wyoming, Idaho, and Montana, and over the high districts of the Sierras in California.

PRECIPITATION.

The distribution of precipitation during July, 1907, is graphically shown on Chart IV by appropriate shading or by figures representing the actual amount of fall.

The rather frequent changes in pressure and the frequent intermingling of warm southerly winds with cooler winds from northerly points were favorable to the development of the usual summer type of local storms, which were especially frequent over the northern half of the country east of the Rocky Mountains and in Arizona and New Mexico. At numerous points in the above districts severe wind, rain, and hailstorms, the details of which appear in other portions of this volume, were destructive of human life and seriously damaged buildings, crops, etc.

The local character of the precipitation is well illustrated on Chart IV, where areas of excessive and deficient amounts appear in close proximity and with unusual frequency.

While small areas appear with decidedly deficient rainfall, the distribution during the several periods of the month was generally favorable to the rapid growth and development of

vegetation. The precipitation over the great central valleys, embracing the greater portion of the corn-growing States, was abundant in amount and generally well distributed thru the month. Over most of the cotton-growing States the precipitation was somewhat deficient in total amount, but frequent light showers prevented injury to agricultural interests.

Precipitation was decidedly light for the season over the Atlantic coast districts from southern New England to Florida, where the total fall was from 2 to 4 inches less than the average, and also over southern Louisiana, eastern and northern Texas, Arkansas, Oklahoma, and southern Kansas, where but little precipitation occurred prior to the 8th, and from the 15th to the 25th practically no rain fell over large portions of the district.

In portions of Arkansas and Oklahoma the month was the driest on record. At Little Rock, Ark., the monthly amount, 0.53 inch, was less than previously recorded in a period of about thirty years, and represented but 13 per cent of the average fall for July.

The usual midsummer precipitation set in over Arizona about the 3d of the month, extending into New Mexico somewhat later, and large portions of both territories received generous and well-distributed amounts at frequent intervals during the month.

The run-off from the heavy rains added materially to the volume of water available for irrigation in the streams of those territories, and the volume of water in the Colorado River was maintained at very high stages during the month.

Heavy precipitation occurred locally over portions of central Kansas, eastern Nebraska, central Iowa, Ohio, West Virginia, western Maryland, and south-central Mississippi.

At Vicksburg, Miss., and vicinity, a terrific rainstorm occurred on the 13th, doing much damage to local interests and breaking the record for heavy precipitation at that station. The amount of fall was nearly 8 inches, of which more than 6 inches fell in four hours.

Precipitation was generally deficient in the Lake region and on the Pacific coast. No rain occurred over the greater portion of the lower elevations of California, and but little in the mountain districts of that State.

HUMIDITY AND SUNSHINE.

Over the Atlantic and Gulf districts, except portions of Florida, the relative humidity was below normal, and this condition also prevailed along the coast of California. Over the remaining districts the amount of moisture in the atmosphere was everywhere above the average, with marked excesses in the northern and central Rocky Mountain and Plateau districts.

A decided excess of sunshine was the rule over Arkansas, Oklahoma, and surrounding districts, the Middle Atlantic States, northern Florida, Colorado, and portions of Oregon and Washington.

From New England westward over the Lake region, upper Mississippi and Missouri valleys, and northern Rocky Mountain districts there was an excess of cloudiness, tho not in proportion to the number of rainy days, which was generally well above the average. Lack of sunshine with a marked excess of cloudy days was also the rule over most of Arizona and portions of New Mexico.

As a result of the seasonable temperature and generous and well-distributed amounts of precipitation received during the month all classes of vegetation made rapid advancement toward normal stages of development, and despite the late opening of the season and the unfavorable conditions attending its early progress the end of July brought favorable prospects for a successful year to all agricultural interests.

WEATHER IN ALASKA.

Reports furnished by the courtesy of the Chief Signal Officer of the Army and by cooperative observers from Alaska indicate the continuance of seasonable weather in that Territory. Considerable cloudy weather and about the normal amount of rainfall prevailed along the coast, while in the interior comparatively clear weather and occasional light showers were the rule.

Temperatures were moderate, as shown by the record from Circle, a point in the interior of the Territory near the Arctic Circle, where the highest temperature recorded was 96°, the lowest, 40°; the average of the highest point reached daily was 77°, and the average of the lowest point reached daily was 46°, with a monthly mean temperature of 62°—values that compare favorably with those recorded at the more northern localities along the Atlantic seaboard.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	12	68.4	— 0.6	—19.0	— 2.7
Middle Atlantic	16	74.5	— 0.2	—12.4	— 1.8
South Atlantic	10	80.3	+ 1.2	+ 4.2	+ 0.6
Florida Peninsula*	8	81.4	+ 0.3	+10.8	+ 1.5
East Gulf	11	81.3	+ 1.1	+13.0	+ 1.9
West Gulf	10	82.1	+ 0.2	+14.1	+ 2.0
Ohio Valley and Tennessee	13	76.9	+ 0.1	— 2.9	— 0.4
Lower Lake	10	70.0	— 1.5	—15.3	— 2.2
Upper Lake	12	67.2	— 0.6	—10.7	— 1.5
North Dakota*	9	66.4	— 1.8	—21.2	— 3.0
Upper Mississippi Valley	15	74.8	— 0.4	— 6.9	— 1.0
Missouri Valley	12	75.1	— 0.7	— 3.2	— 0.5
Northern Slope	9	65.9	— 1.9	— 8.1	— 1.2
Middle Slope	6	77.2	+ 0.6	+ 7.5	+ 1.1
Southern Slope*	7	80.2	— 0.2	+13.6	+ 1.9
Southern Plateau*	12	75.5	— 1.5	+ 1.5	+ 0.2
Middle Plateau*	10	70.3	— 0.5	+ 8.9	+ 1.3
Northern Plateau*	12	67.5	— 0.8	— 2.8	— 0.4
North Pacific	7	61.6	+ 0.4	— 0.5	— 0.1
Middle Pacific	8	65.8	— 1.0	— 1.3	— 0.2
South Pacific	4	71.2	+ 1.4	+ 5.2	+ 0.7

* Regular Weather Bureau and selected cooperative stations.

In Canada.—Director R. F. Stupart says:

A supernormal mean temperature was recorded in July over Vancouver Island and the Cariboo District of British Columbia; also very locally in Alberta, Saskatchewan, Ontario and southwestern Quebec, but over the greater portion of Canada the mean temperature was subnormal. Departures from average were not pronounced, except locally in southwestern Saskatchewan, where a negative departure of 5° was recorded at Swift Current.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	12	2.73	77	—0.8	—4.5
Middle Atlantic	16	2.97	68	—1.4	—3.9
South Atlantic	10	4.06	67	—2.0	—8.3
Florida Peninsula*	8	6.61	102	+0.1	—5.0
East Gulf	11	5.45	98	—0.1	—2.7
West Gulf	10	1.91	59	—1.3	—5.2
Ohio Valley and Tennessee	13	4.87	86	—0.8	—2.0
Lower Lake	10	3.32	97	—0.1	—1.2
Upper Lake	12	3.08	100	0.0	—2.1
North Dakota*	9	3.42	132	+0.9	—1.4
Upper Mississippi Valley	15	5.72	158	+2.1	+0.6
Missouri Valley	12	4.73	123	+0.9	—0.6
Northern Slope	9	2.31	153	+0.8	+1.1
Middle Slope	6	2.64	87	—0.4	—1.8
Southern Slope*	7	2.17	116	+0.3	—0.6
Southern Plateau*	12	1.19	86	—0.2	+1.7
Middle Plateau*	10	0.75	88	—0.1	+1.7
Northern Plateau*	12	0.85	131	+0.2	+1.1
North Pacific	7	0.64	86	—0.1	—7.3
Middle Pacific	8	T.	100	0.0	+2.9
South Pacific	4	0.01	100	0.0	+1.7

* Regular Weather Bureau and selected cooperative stations.

In Canada.—Director Stupart says:

Precipitation in July was deficient over a considerable portion of Canada, but an excess was recorded over large sections of Manitoba, New Ontario, Quebec, and the Maritime Provinces. Vancouver Island, in British Columbia, also recorded an amount slightly in excess of the average. Departures from normal were very marked, positive differences being as high as 95 per cent in the Gaspé Peninsula of Quebec and

northern New Brunswick, while negative departures of from 55 to 64 per cent were recorded in the southern portions of Alberta and Saskatchewan.

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.0	+ 0.1	Missouri Valley	4.3	− 0.1
Middle Atlantic	4.6	− 0.2	Northern Slope	3.9	+ 0.1
South Atlantic	4.6	− 0.4	Middle Slope	4.0	0.0
Florida Peninsula	4.1	− 0.9	Southern Slope	4.2	+ 0.4
East Gulf	5.4	+ 0.4	Southern Plateau	3.2	− 0.1
West Gulf	3.7	− 0.5	Middle Plateau	2.9	+ 0.9
Ohio Valley and Tennessee	4.6	0.0	Northern Plateau	3.6	+ 0.5
Lower Lake	4.7	+ 0.2	North Pacific	4.5	+ 0.1
Upper Lake	4.9	+ 0.2	Middle Pacific	4.3	+ 1.4
North Dakota	4.6	+ 0.3	South Pacific	2.5	− 0.2
Upper Mississippi Valley	4.7	+ 0.4			

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	77	− 3	Missouri Valley	70	+ 4
Middle Atlantic	73	− 1	Northern Slope	63	+ 9
South Atlantic	79	− 1	Middle Slope	62	+ 2
Florida Peninsula	79	− 1	Southern Slope	63	+ 4
East Gulf	77	− 1	Southern Plateau	43	+ 3
West Gulf	73	− 1	Middle Plateau	38	+ 6
Ohio Valley and Tennessee	72	+ 3	Northern Plateau	47	+ 7
Lower Lake	72	+ 3	North Pacific	75	+ 1
Upper Lake	73	+ 1	Middle Pacific	61	+ 3
North Dakota	72	+ 5	South Pacific	62	− 2
Upper Mississippi Valley	74	+ 6			

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Amarillo, Tex	1	53	n.	Minneapolis, Minn	13	53	w.
Do	10	55	nw.	Modena, Utah	4	50	sw.
Augusta, Ga	25	50	w.	Mount Tamalpais, Cal	6	56	nw.
Block Island, R. I	20	50	nw.	North Head, Wash	3	58	se.
Cairo, Ill	19	54	nw.	Pierre, S. Dak	4	51	w.
Del Rio, Tex	2	66	ne.	Point Reyes Light, Cal	3	53	nw.
Duluth, Minn	23	56	nw.	Do	7	50	nw.
Hannibal, Mo	25	56	ne.	Do	14	59	nw.
Huron, S. Dak	20	50	ne.	Do	25	56	nw.
Lewiston, Idaho	3	52	w.	San Antonio, Tex	2	60	nw.
Lincoln, Nebr	18	52	n.	Wilmington, N. C	10	50	nw.
Louisville, Ky	9	60	w.				

CLIMATOLOGICAL SUMMARY.

By Mr. JAMES BERRY, Chief of the Climatological Division.

TEMPERATURE AND PRECIPITATION BY SECTIONS, JULY, 1907.

In the following table are given, for the various sections of the Climatological Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Section.	Temperature—in degrees Fahrenheit.							Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.					Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.			Station.	Amount.	Station.	Amount.
Alabama	81.0	+ 0.8	Decatur	104	23	Riverton	56	4	5.00	+ 0.20	Lucy	10.09	Decatur	1.68
Arizona	82.5	— 1.3	§Aztec	122	5§	Flagstaff (a)	36	16	2.38	+ 0.80	Huachuca Reservoir	9.27	Mohawk Summit	0.00
			§Maricopa	122	3§									
Arkansas	81.4	+ 1.2	Heber	108	23	Jonesboro	53	4	1.96	— 2.08	Forrest City	5.32	Heber	T.
California	73.1	— 1.2	Mammoth Tank	123	2,4	Tamarack	28	15	0.03	— 0.03	Tamarack	2.40	Many stations	0.00
Colorado	66.7	— 0.3	Las Animas	106	20	Breckenridge	20	16	2.45	+ 0.03	Lamar	6.09	Whitepine	0.16
Florida	81.3	— 0.2	Wausau	102	22	Galt	58	6	7.75	+ 0.65	Mount Pleasant	15.07	Key West	0.68
Georgia	81.0	+ 0.9	Eastman	106	24	Clayton	53	2	5.04	+ 0.15	Blakely	12.77	Carollton	1.55
Hawaii	74.9†		Kihei, Maui	93	3 dates	Waimea, Hawaii	48	8,9	6.38‡		Hakalau, Hawaii	23.92	Kihei, Maui	0.10
Idaho	66.2	— 0.7	Orofino	105	31	Forney	28	16	0.86	+ 0.17	Forney	3.23	Oakley	0.00
Illinois	75.7	0.0	Equality	103	25	Aurora	40	3	5.75	+ 1.89	Tiskilwa	10.17	McLeansboro	1.62
Indiana	74.8	— 0.6	Rome	103	25	§Auburn	43	3§	4.95	+ 1.75	Vevay	8.45	Rome	1.51
						§Plymouth	43	3§						
Iowa	73.7	— 0.4	Thurman	102	5	Alton	41	2	7.27	+ 2.92	Belle Plaine	13.66	Elkader	3.97
Kansas	78.4	+ 0.7	4 stations	106	24	Wallace	50	15	3.78	+ 0.10	Cunningham	9.32	Lebanon	T.
Kentucky	78.1	+ 0.5	Paducah	102	25	Berea	40	27	4.71	+ 0.46	West Liberty	8.37	Irvington	1.12
Louisiana	82.7	+ 1.2	Minden	106	23	Plain Dealing	58	5	4.07	— 1.94	Schriever	8.92	Ruston	1.00
Maryland and Delaware	74.7	— 0.6	Cumberland, Md	99	3 dates	Deer Park, Md	39	4,27	3.94	— 0.56	Bachmans Val., Md	7.83	Pocomoke City, Md.	1.52
Michigan	67.4	— 1.3	St. Joseph	99	25	3 stations	30	2	2.78	— 0.44	Kalamazoo	7.00	Kenton	0.10
Minnesota	68.2	— 0.8	§Milaca	97	3§	Stephens Mine	36	2	3.56	— 0.27	Lake Crystal	9.50	Collegeville	1.53
			§New Ulm	97	4§									
Mississippi	81.5	+ 0.5	3 stations	104	23,24	§Batesville	57	4§	4.64	— 0.31	Hattiesburg	13.16	Hernando	1.20
						§Clarksdale	57	4,5§						
Missouri	78.4	+ 1.4	Caruthersville	105	23	Mexico	51	27	4.57	+ 0.16	Maryville	12.37	Dean	0.71
Montana	63.4	— 2.4	Miles City	102	3	Gold Butte	24	13	1.98	+ 0.49	Evans	6.80	Fort Logan	0.15
Nebraska	73.5	— 0.2	Lynch	105	4	Kennedy	37	15	4.57	+ 1.36	Nemaha	14.30	Alma	0.33
Nevada	69.2	— 1.2	Logan	113	5	Squaw Valley	27	14	0.06	— 0.29	Hamilton	0.69	8 stations	0.00
New England*	69.0	— 0.2	Millinocket, Me	106	19	Northfield, Vt	38	4	3.02	— 1.20	Madison, Me	7.34	Hyannis, Mass	0.62
New Jersey	73.6	— 0.7	Browns Mills	93	17	Newton	40	4	2.62	— 2.37	College Farm	6.42	Newark	0.95
New Mexico	72.3	0.0	Lordsburg	107	2	Winsors	30	3	2.30	— 0.24	Las Vegas	5.57	Strauss	T.
New York	69.0	— 0.7	Ticonderoga	95	18	Indian Lake	32	4	3.03	— 1.40	Bouckville	6.66	Cutchogue	0.61
North Carolina	78.5	+ 0.6	§Carl	102	23§	Buck Spring	45	2,4	4.73	— 0.92	New Bern	9.82	Lexington	1.24
			§Kinston	102	9,23§									
North Dakota	65.8	— 2.0	Medora	103	23	Edmore	31	1	3.14	+ 0.69	Palermo	6.00	Buford	1.11
Ohio	72.6	— 1.3	Frankfort	98	22	Oberlin	37	3	5.36	+ 1.40	Philo	11.29	Frankfort	1.00
Oklahoma and Indian Territories.	80.7	+ 0.2	Mangum, Okla	109	26	Okeene, Okla	52	30	2.13	— 1.67	Jefferson, Okla	7.56	Cloud Chief, Okla	0.12
Oregon	66.7	+ 1.4	§Blalock	107	30§	Granite	30	5	0.51	— 0.03	Joseph	2.10	Huntington	0.00
			§Mill City	107	30§									
Pennsylvania	71.5	— 0.6	Wilkes-Barre	96	18	Pocono Lake	34	4	3.84	— 0.80	Aleppo	9.46	Easton	1.01
Porto Rico	78.3		Central Aguirre	98	24	Las Marias	59	9	5.29		Maricao	12.80	Central Aguirre	1.47
South Carolina	81.4	+ 1.6	Blackville	106	8	Walhalla	56	15	5.06	— 0.55	Edisto	9.01	Greenville	2.27
South Dakota	69.9	— 1.8	Chamberlain	104	4	Kidder	40	26	4.35	+ 1.88	Yankton	7.65	Kidder	1.36
Tennessee	79.2	+ 1.8	Dover	103	25	Erasmus	48	5	4.05	— 0.07	Halls Hill	8.78	Nashville	0.80
Texas	82.1	— 0.6	3 stations	110	1,26	Amarillo	55	1	2.85	+ 0.19	Colorado	9.42	2 stations	0.20
Utah	70.1	— 0.8	Corinne	108	2	Lucin	29	19,20	0.58	+ 0.01	Modena	2.46	2 stations	0.00
Virginia	75.4	— 0.3	Saxe	100	26	Burkes Garden	42	5	3.49	— 1.20	Spottsville	9.38	Cashville	1.44
Washington	67.8	+ 0.2	Zindel	108	31	Bonita	31	14	0.82	+ 0.13	Rosalia	3.51	Ephrata	0.00
West Virginia	72.7	— 1.0	Romney	98	16	Bayard	42	28	6.66	+ 2.07	Pickens	13.36	Romney	2.38
Wisconsin	68.5	— 1.6	Solon Springs	96	4	Prentice	31	2	5.14	+ 1.20	Meadow Valley	11.27	Eau Claire	1.12
Wyoming	63.1	— 1.5	Ten Sleep	112	7	South Pass City	23	16	1.44	+ 0.26	Riverside, Y. N. P.	5.46	2 stations	T.

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. † 41 stations, with an average elevation of 583 feet. ‡ 137 stations.

DESCRIPTION OF TABLES AND CHARTS.

By Mr. P. C. DAY, Assistant Chief, Division of Meteorological Records.

For description of tables and charts see page 30 of REVIEW for January, 1907.

TABLE I.—*Climatological data for U. S. Weather Bureau stations, July, 1907.*

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.								Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness during daylight, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.			Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.				
New England.							**68.4**	**— 0.6**									**77**	**2.73**	**— 0.8**									**5.0**	
Eastport	76	69	85	29.74	29.82	— .11	58.8	— 1.0	88	19	66	47	2	51	27	53	83	85	4.32	+ 0.9	14	5,652	s.	24	e.	12	7	13	11	6.2	
Portland, Me	103	81	117	29.72	29.84	— .11	67.1	— 0.9	90	18	75	54	12	60	24	61	57	76	3.63	+ 0.4	13	5,913	s.	30	nw.	27	9	11	11	5.6	
Concord	288	70	79	29.54	29.84	— .12	69.5	+ 0.4	90	18	80	48	4	59	34	....	....	....	6.66	+ 2.9	13	3,416	se.	35	e.	7	20	10	1	2.5	
Burlington	404	12	47	29.41	29.84	— .10	68.2	— 3.0	89	17	78	45	4	59	31	....	....	....	3.68	— 0.1	12	6,777	s.	34	w.	27	9	13	9	5.5	
Northfield	876	16	70	28.93	29.86	— .08	65.2	— 1.4	87	18	77	38	4	54	37	62	59	82	3.45	— 0.2	13	5,125	s.	34	nw.	20	4	20	7	5.6	
Boston	125	115	188	29.73	29.86	— .10	72.4	+ 1.1	91	18	81	58	4	64	25	65	61	70	1.09	— 2.3	7	6,903	w.	30	w.	20	7	16	8	5.4	
Nantucket	12	14	90	29.86	29.87	— .11	67.6	+ 0.1	84	19	74	56	15	61	20	63	61	85	3.32	+ 0.6	10	10,393	sw.	35	sw.	12	10	12	9	5.9	
Block Island	26	11	46	29.86	29.89	— .08	68.4	+ 0.3	85	19	75	56	4	62	19	64	62	84	1.74	— 1.6	9	10,076	sw.	50	nw.	20	12	17	2	4.1	
Narragansett	....	9	....	....	....	....	67.8	— 2.1	86	*	77	52	4	59	26	....	....	....	0.87	— 2.3	8	....	....	....	....	....	23	5	3	....	
Providence	160	57	67	29.71	29.88	— .09	71.6	— 1.8	92	18	81	55	4	62	27	64	61	73	1.06	— 2.3	11	4,350	w.	24	nw.	27	10	16	5	5.0	
Hartford	159	122	132	29.70	29.87	— .10	72.6	+ 1.0	92	18	82	52	4	63	28	64	60	70	1.86	— 2.2	9	4,683	s.	28	nw.	27	4	20	7	5.5	
New Haven	106	116	155	29.77	29.88	— .09	72.2	+ 0.3	90	18	81	52	4	63	28	65	61	71	1.10	— 3.7	7	5,422	s.	30	w.	9	16	11	4	3.8	
Mid. Atlantic States.							**74.5**	**— 0.2**									**73**	**2.97**	**— 1.4**									**4.6**	
Albany	97	102	115	29.77	29.87	— .09	73.0	+ 1.0	92	18	83	54	4	63	30	65	61	71	4.14	+ 0.2	11	4,773	s.	23	nw.	27	10	18	3	4.3	
Binghamton	875	78	90	28.98	29.89	— .08	68.6	— 1.3	87	20	80	44	4	57	36	....	....	....	2.52	— 1.0	8	3,741	w.	26	nw.	27	9	13	9	5.3	
New York	314	108	350	29.56	29.88	— .10	74.8	+ 1.3	89	8	82	61	5	67	23	66	62	69	1.18	— 3.4	7	6,847	s.	45	nw.	27	8	16	7	5.0	
Harrisburg	374	94	104	29.52	29.91	— .07	75.0	+ 0.5	90	18	84	54	4	66	25	67	63	69	1.99	— 1.9	13	4,278	w.	27	sw.	10	10	18	3	4.4	
Philadelphia	117	116	184	29.79	29.91	— .07	76.9	+ 1.1	93	25	85	61	4	69	24	68	63	67	3.90	— 0.4	9	6,176	sw.	24	sw.	24	7	10	14	6.1	
Scranton	805	111	119	29.06	29.90	— .08	71.4	— 0.4	89	18	82	47	4	61	32	64	59	68	2.67	— 1.2	12	4,572	sw.	28	nw.	27	8	17	6	5.3	
Atlantic City	52	37	48	29.86	29.91	— .07	72.2	— 0.3	91	8	79	59	27	66	24	67	64	79	1.57	— 2.2	6	5,062	sw.	22	s.	7	5	14	12	5.7	
Cape May	17	48	52	29.92	29.94	— .04	72.1	— 1.3	88	8	78	60	4	66	22	67	....	....	3.38	— 0.4	8	4,711	s.	30	w.	11	9	20	2	4.5	
Baltimore	123	69	117	29.78	29.90	— .08	76.6	— 0.7	93	8	85	59	4	68	26	68	64	68	5.76	+ 0.9	12	4,615	nw.	39	n.	18	9	13	9	5.5	
Washington	112	59	76	29.80	29.92	— .08	75.8	— 1.0	93	8	86	52	4	66	29	70	66	74	1.55	— 3.1	6	3,997	nw.	33	nw.	7	12	13	6	5.0	
Cape Henry	18	11	58	29.92	29.94	— .05	77.6	+ 0.1	97	26	85	60	4	71	27	....	....	....	2.31	— 3.5	8	7,382	sw.	44	w.	26	20	9	2	2.8	
Lynchburg	681	83	88	29.23	29.95	— .06	77.1	— 0.2	95	26	87	57	28	67	31	70	68	78	2.63	— 1.4	13	1,940	nw.	23	sw.	19	12	15	4	4.6	
Mount Weather	1,725	10	57	28.17	29.92	— .07	70.7	— 0.7	86	8	78	53	27	64	20	65	63	78	3.41	— 1.2	12	9,394	nw.	42	w.	9	16	13	2	3.5	
Norfolk	91	102	111	29.85	29.95	— .05	78.9	— 0.5	95	8	87	64	4	71	24	72	69	77	4.46	— 1.3	12	5,488	s.	34	sw.	12	15	12	4	4.2	
Richmond	144	145	153	29.80	29.94	— .07	79.1	— 0.1	96	11	88	61	4	70	27	....	....	....	2.99	— 1.4	15	5,080	s.	36	w.	3	17	11	3	3.8	
Wytheville	2,293	40	47	27.67	29.96	— .05	72.6	0.0	89	9	83	52	5	62	30	66	64	81	3.11	— 1.3	12	3,237	w.	20	nw.	26	18	10	3	3.5	
S. Atlantic States.							**80.3**	**+ 1.2**									**79**	**4.06**	**— 2.0**									**4.6**	
Asheville	2,255	53	75	27.71	29.98	— .04	74.0	+ 2.3	91	9	84	55	5	63	28	68	66	85	2.52	— 2.3	15	3,474	nw.	33	nw.	26	8	14	9	5.7	
Charlotte	773	68	76	29.16	29.98	— .04	79.6	+ 0.9	97	7	89	65	4	70	28	71	68	73	5.30	— 0.2	14	3,797	s.	31	**nw.**	24	9	13	9	5.2	
Hatteras	11	12	47	29.95	29.96	— .05	78.7	+ 0.1	93	9	84	66	28	73	17	74	73	84	2.48	— 3.6	10	9,376	sw.	35	w.	29	23	7	1	2.5	
Raleigh	376	71	79	29.57	29.95	— .07	80.1	+ 1.6	98	23	91	57	28	70	29	71	68	72	1.42	— 4.7	8	3,905	sw.	26	sw.	11	13	13	5	4.3	
Wilmington	78	81	91	29.89	29.97	— .04	80.3	+ 1.6	100	8	88	64	5	72	28	74	72	82	6.40	— 0.6	16	5,402	sw.	50	nw.	10	11	18	2	4.5	
Charleston	48	14	92	29.94	29.99	— .04	82.3	+ 1.0	100	8	89	70	6	76	21	75	73	79	2.33	— 4.9	13	7,012	sw.	38	n.	24	17	6	8	4.4	
Columbia, S. C	351	41	57	29.60	29.97	— .05	81.7	+ 0.6	101	8	92	65	5	72	27	72	69	75	3.56	— 2.5	14	4,149	sw.	42	sw.	11	9	14	8	5.4	
Augusta	180	89	97	29.78	29.97	— .05	82.2	+ 1.7	102	24	92	66	5	72	29	73	71	76	3.47	— 1.8	13	3,855	s.	50	w.	25	14	16	1	3.5	
Savannah	65	81	89	29.93	30.00	— .03	82.1	+ 1.6	100	8	90	68	24	74	28	74	72	81	7.62	+ 1.4	12	5,186	sw.	37	s.	24	11	11	9	4.9	
Jacksonville	43	101	129	29.97	30.02	— .01	81.7	+ 0.8	97	21	89	70	14	74	23	75	73	83	5.55	— 0.6	18	7,109	sw.	45	sw.	2	9	15	7	5.2	
Florida Peninsula.							**82.1**	**+ 0.5**									**79**	**3.45**	**— 1.8**									**4.1**	
Jupiter	28	10	48	30.01	30.04	+ .01	81.6	+ 0.6	96	20	89	69	26	75	21	75	75	83	4.34	— 1.0	15	6,123	sw.	36	w.	26	7	24	0	4.7	
Key West	22	10	53	30.01	30.03	.00	83.8	+ 0.1	91	30	89	74	15	79	12	76	73	71	0.68	— 2.9	10	5,144	e.	20	ne.	8	15	13	3	4.0	
Sand Key	25	41	71	30.00	30.03	.00	83.0	.....	93	30	86	74	14	80	12	....	....	....	0.15	— 3.4	7	6,869	e.	34	ne.	8	22	8	1	3.1	
Tampa	35	79	96	30.01	30.04	.00	80.9	+ 0.9	92	8	88	68	22	74	22	75	73	83	8.63	+ 0.2	20	5,236	sw.	39	s.	3	14	16	1	3.5	
East Gulf States.							**81.3**	**+ 1.1**									**77**	**5.45**	**— 0.1**									**5.4**	
Atlanta	1,174	190	216	28.79	30.00	— .02	80.1	+ 2.5	98	24	90	64	10	71	30	71	68	74	3.09	— 1.6	11	5,793	nw.	44	se.	10	14	5	12	4.9	
Macon	370	55	66	29.60	29.99	— .03	83.0	+ 3.3	102	23	93	68	5	73	28	....	....	....	2.24	— 2.4	9	3,270	sw.	29	sw.	11	11	13	7	5.0	
Thomasville	273	8	57	29.72	30.01	— .02	80.9	— 0.9	99	22	90	68	18	71	26	74	72	84	8.87	+ 3.6	18	3,484	sw.	22	sw.	25	7	13	11	5.8	
Pensacola	56	79	96	29.95	30.01	.00	81.0	— 0.4	96	21	87	71	3	75	19	....	....	....	9.20	+ 1.9	11	6,678	sw.	33	sw.	13	5	12	14	6.8	
Anniston	741	9	58	29.24	30.02	.00	79.9	+ 2.0	98	24	91	64	3	68	29	....	....	....	4.39	— 0.3	11	2,807	n.	24	sw.	12	11	13	7	5.1	
Birmingham	700	136	144	29.25	30.00	— .01	80.8	— 0.7	98	24	90	65	4	71	29	72	69	78	5.42	+ 0.7	9	3,999	sw.	36	se.	20	3	19	9	6.5	
Mobile	57	98	106	29.95	30.01	.00	81.9	+ 1.4	98	22	89	71	4	74	21	74	72	78	2.60	— 4.4	13	5,068	s.	26	se.	9	5	17	9	6.1	
Montgomery	223	100	112	29.76	30.00	— .02	81.6	+ 0.6	98	21	91	67	3	72	27	73	71	76	4.29	— 0.4	10	4,189	sw.	24	sw.	27	6	18	7	5.5	
Meridian	375	84	93	29.61	29.99	— .03	80.7	+ 0.7	98	23	90	66	4	71	24	72	70	75	4.49	0.0	11	3,209	sw.	30	sw.	9	15	10	6	4.1	
Vicksburg	247	62	74	29.73	30.01	+ .01	81.6	+ 1.2	96	23	90	66	4	73	25	74	71	76	10.88	+ 6.5	9	3,845	sw.	31	w.	13	8	18	5	4.8	
New Orleans	51	88	121	29.95	30.00	.00	83.2	+ 1.9	97	23	90	70	11	76	19	75	73	77	4.47	— 2.0	12	5,827	sw.	29	**se.**	23	9	18	7	5.1	
West Gulf States.							**82.1**	**+ 0.2**									**73**	**1.91**	**— 1.3**									**3.7**	
Shreveport	249	77	84	29.73	29.99	+ .01	83.3	+ 1.2	100	23	93	66	5	73	26	73	69	70	1.47	— 2.2	6	3,985	se.	21	sw.	10	23	4	4	3.0	
Bentonville	1,303	11	44	28.64	30.00	+ .03	78.0	— 0.5	97	24	89	59	12	67	30	....	....	....	0.81	— 3.5	5	3,665	s.	19	s.	15	25	6	0	2.0	
Fort Smith	457	79	94	29.48	29.95	— .02	81.6	+ 0.6	99	23	92	66	5	71	27	73	70	74	4.32	+ 0.5	6	4,151	s.	30	s.	10	23	8	0	1.9	
Little Rock	357	93	100	29.60	29.96	— .03	82.5	+ 1.9	100	23	92	64	5	73	28	73	68	67	0.53	— 3.5	3	4,600	s.	26	nw.	28	7	19	5	4.9	
Corpus Christi	20	48	53	29.95	29.98	+ .02	81.8	— 0.9	89	29	87	71	8	77	15	76	74	81	0.56	— 1.1	6	2,346	se.	33	se.	14	20	6	5	3.2	
Fort Worth	670	106	114	29.26	29.96	.00	82.6	— 1.1	101	28	92	64	6	73	28	....	....	....	4.15	+ 1.1	7	7,264	s.	33	s.	8	20	10	1	3.0	
Galveston	54	106	112	29.95	30.01	+ .03	83.3	+ 0.3	91	23	87	72	20	79	14	76	73	76	1.49	— 2.5	8	8,119	s.	26	se.	14	12	11	8	4.6	
Palestine	510	73	79	29.44	29.96	— .01	81.8	+ 0.3	96	28	91	65	5	72	24	73	69	73	0.80	— 2.2	5	5,294	s.	30	s.	10	3	18	10	6.2	
San Antonio	701	80	91	29.23	29.94	— .01	83.3	+ 0.9	103	1	94	66	2	73	30	72	68	70	2.68	+ 0.5	6	4,968	se.	60	nw.	2	14	14	3	4.3	
Taylor	583	55	63	29.36	29.97	— .01	82.4	— 0.3	99	28	93	66	3	72	29	....	....	....	2.30	— 0.3	6	6,673	s.	30	se.	9	18	9	4	3.5	
Ohio Val. and Tenn.							**76.9**	**+ 0.1**									**72**	**4.87**	**— 0.8**									**4.6**	
Chattanooga	762	106	112	29.20	29.99	— .03	80.6	+ 2.8	96	9	90	63	5	71	27	71	67	70	2.11	— 1.8	6	4,234	sw.	32	sw.	9	12	14	5	4.3	
Knoxville	1,004	93	100	28.95	29.97	— .05	78.8	+ 2.6	96	23	89	60	5	69	28	70	66	69	3.04	— 1.2	8	3,262	sw.	29	ne.	24	8	18	5	4.9	
Memphis	399	76	97	29.58	29.99	— .01	81.8	+ 1.1	98	23	90	65	4	74	25	74	70	72	3.48	0.0	8	5,544	sw.	38	n.	1	20	9	2	2.6	
Nashville	546	79	91	29.42	29.99	— .02	81.6	+ 2.2	100	23	92	59	4	71	32	70	66	63	0.80	— 3.6	7	3,702	sw.	24	sw.	11	15	10	6	4.2	
Lexington	989	75	102	28.94	29.98	— .03	75.5	— 1.1	92	9	85	56	3	66	27	....	....	....	4.42	0.0	12	6,009	sw.	46	nw.	10	20	8	3	3.3	
Louisville	525	111	132	29.40	29.98	— .02	79.3	+ 0.7	98	25	90	56	3	69	34	70	66	68	5.63	+ 1.9	12	4,994	sw.	60	w.	9	10	17	4	4.8	
Evansville	431	72	82	29.48	29.94	— .06	79.0	— 0.3	98	25	89	56	3	69	29	....	....	....	4.66	+ 0.8	11	4,327	sw.	41	n.	20	12	19	0	4.3	
Indianapolis	822	154	164	29.08	29.95	— .04	75.1	— 1.1	93	6	84	52	3	66	26	68	64	73	4.41	+ 0.3	12	5,516	sw.	33	s.	15	13	12	6	5.1	
Cincinnati	628	152	160	29.30	29.96	— .04	77.0	— 0.7	95	6	86	56	4	68	29	68	63	67	5.59	+ 2.0	12	4,164	sw.	41	w.	7	5	21	5	5.4	
Columbus	824	173	224	29.10	29.95	— .05	73.9	— 1.4	92	22	84	50	3	64	26	67	64	75	6.07	+ 2.4	16	6,859	nw.	40	w.	25	8	17	6	5.2	
Pittsburg	842	336	352	29.05	29.93	— .07	72.6	— 2.0	87	19	82	53	4	64	29	65	62	73	4.95	+ 0.5	13	6,258	sw.	37	sw.	10	6	19	6	5.6	
Parkersburg	638	77	84	29.31	29.96	— .05	74.3	— 1.3	92	22	84	54	3	64	26	68	65	79	7.02	+ 2.4	16	3,465	s.	42	**nw.**	1	14	14	3	4.0	
Elkins	1,940	41	50	27.99	29.97	— .04	69.8	— 0.7	87	15	81	48	27	59	33	64	62	86	11.10	+ 6.5	22	2,067	w.	18	w.	11	6	20	5	5.5	
Lower Lake Region.							**70.0**	**— 1.5**									**72**	**3.32**	**— 0.1**									**4.7**	
Buffalo	767	178	206	29.08	29.89	— .08	69.0	— 1.2	87	19	75	51	3	62	23	63	59	78	2.53	— 0.9	11	8,932	sw.	43	nw.	20	10	16	5	5.1	
Canton	448	10	71	29.36	29.83	.....	67.9	— 2.6	86	17	78	45	3	58	27	....	....	....	1.85	— 1.4	9	7,572	sw.	45	w.	26	13	12	6	4.9	
Oswego	335	76	91	29.51	29.87	— .09	67.8	— 1.8	85	16	75	49	4	60	24	62	58	75	4.16	+ 0.9	10	5,806	w.	30	w.	26	11	15	5	4.4	
Rochester	523	81	102	29.34	29.89	— .08	70.4	0.0	89	15	80	48	3	61	28	62	57	66	2.00	— 1.1	6	5,786	sw.	27	sw.	8	7	16	8	5.3	
Syracuse	597	97	113	29.26	29.89	— .08	69.3	— 1.5	85	16	78	49	4	61	26	....	....	....	4.88	+ 1.2	14	7,406	s.	39	w.	27	11	16	4	4.9	
Erie	713	92	102	29.16	29.92	— .06	69.4	— 2.4	87	15	76	52	4	63	19	63	59	71	3.42	+ 0.2	9	6,286	w.	28	w.	8	13	12	6	4.7	
Cleveland	762	190	201	29.12	29.93	— .06	70.2	— 2.3	86	15	77	46	3	63	21	64	60	71	3.63	+ 0.1	10	8,674	se.	45	nw.	24	12	16	3	4.4	
Sandusky	629	62	70	29.26	29.93	— .06	72.6	— 1.0	87	17	80	54	4	65	24	....	....	....	4.43	+ 0.6	11	5,170	sw.	23	nw.	22	14	13	4	4.3	
Toledo	628	207	246	29.26	29.94	— .05	72.9	— 0.8	88	19	82	54	3	64	23	66	63	73	3.59	+ 0.4	10	8,527	sw.	40	sw.	1	13	14	4	4.1	
Detroit	730	218	258	29.16	29.93	— .05	71.0	— 1.0	86	16	79	52	27	63	26	65	61	74	2.71	— 0.8	8	8,227	w.	35	w.	22	10	12	9	5.3	
Upper Lake Region.							**67.2**	**— 0.6**									**73**	**3.08**	**0.0**									**4.9**	
Alpena	609	13	92	29.24	29.90	— .07	66.3	+ 0.5	84	24	77	43	3	56	32	60	57	75	0.94	— 2.1	9	7,002	nw.	34	n.	26	11	15	5	4.7	
Escanaba	612	40	82	29.25	29.90	— .07	64.8	— 1.7	83	17	74	42	2	56	28	60	56	72	2.93	— 0.4	11	6,420	s.	27	s.	14	18	11	2	3.5	
Grand Haven	632	54	92	29.24	29.90	— .08	67.6	— 2.1	82	16	75	50	3	60	25	63	60	77	6.19	+ 3.6	10	6,408	sw.	30	s.	3	7	17	7	5.5	

TABLE I.—*Climatological data for U. S. Weather Bureau stations, July, 1907*—Continued.

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.									Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.				Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness during daylight, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.				Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.				
Up. Lake Reg—Cont.																													
Grand Rapids	707	121	162	29.17	29.92	— .06	70.4	— 2.2	86	24	80	49	3	61	26	64	60	72	5.34	+ 2.7	12	6,330	w.	34	w.	8	12	13	6	4.8
Houghton	668	66	74	29.16	29.87	— .09	65.4	+ 0.1	86	13	76	45	2	55	29				1.00	— 2.1	9	4,819	w.	24	w.	25	12	17	2	3.9
Marquette	734	77	116	29.11	29.90	— .06	64.2	— 0.7	84	13	72	47	5	56	25	58	54	70	2.13	— 1.0	12	6,641	w.	32	nw.	25	10	14	7	5.2
Port Huron	638	70	120	29.23	29.92	— .06	68.8	— 0.2	90	17	79	42	3	59	30	62	59	78	1.98	— 0.8	10	6,635	sw.	36	nw.	25	11	16	4	4.5
Sault Ste. Marie	614	40	61	29.21	29.90	— .07	61.2	— 0.7	82	14	71	42	3	51	33	57	53	77	2.29	— 0.5	12	5,564	nw.	35	nw.	25	9	12	10	5.5
Chicago	823	140	310	29.06	29.93	— .05	73.3	+ 0.9	90	21	80	55	3	67	25	66	63	78	3.15	— 0.5	13	8,584	sw.	43	w.	25	3	19	9	5.8
Milwaukee	681	122	138	29.22	29.94	— .03	70.1	+ 0.4	90	24	78	52	3	62	24	63	60	74	5.89	+ 2.9	10	6,043	w.	30	sw.	15	9	17	5	4.8
Green Bay	617	49	86	29.24	29.90	— .07	69.2	— 0.3	86	25	80	47	2	59	31	63	60	73	1.75	— 1.8	11	6,129	sw.	33	nw.	25	8	14	12	6.5
Duluth	1,133	11	47	28.70	29.89	— .06	65.7	— 0.3	85	13	76	46	5	55	27	59	55	71	3.41	— 0.2	10	8,799	nw.	56	nw.	23	12	15	4	3.9
																		72	2.86	0.0										4.0
North Dakota.							66.4	— 2.8																						
Moorhead	940	8	57	28.93	29.93	— .01	67.0	— 1.7	88	3	78	47	26	56	31	62	59	79	2.98	— 0.8	9	4,388	nw.	24	nw.	13	8	17	6	4.7
Bismarck	1,674	8	57	28.19	29.95	+ .02	67.4	— 2.8	97	3	80	47	26	55	42	60	56	69	4.32	+ 2.2	14	5,831	nw.	43	w.	13	12	15	4	4.5
Devils Lake	1,482	11	44	28.35	29.90	— .03	65.8	— 2.3	87	3	73	43	1	54	30	59	55	73	2.31	— 1.4	11	6,714	w.	38	w.	12	14	11	6	4.5
Williston	1,875	14	44	27.96	29.91	— .01	65.2	— 4.2	92	3	78	43	26	52	39	57	51	65	1.82	— 0.2	8	4,800	w.	35	nw.	20	11	14	6	4.9
																		74	5.72	+ 2.1										4.7
Upper Miss. Valley.							74.3	— 0.4																						
Minneapolis		102	208				71.2		90	3	80	55	26	62	28				4.20	+ 0.4	8	7,114	nw.	53	w.	13	7	17	7	5.2
St. Paul	837	171	179	29.02	29.91	— .04	70.7	— 1.4	90	3	80	54	26	61	29	63	58	68	4.70	+ 1.3	7	6,216	nw.	42	w.	13	10	18	3	5.3
La Crosse	714	71	87	29.15	29.90	— .06	72.2	— 0.4	90	5	82	50	2	62	28				5.67	+ 1.6	10	4,314	s.	32	n.	21	3	16	12	6.5
Madison	974	70	78	28.89	29.91	— .06	71.0	+ 1.4	87	24	79	50	3	62	28	65	63	78	5.84	+ 1.8	11	5,556	nw.	35	nw.	21	9	16	6	5.1
Charles City	1,015	8	58	28.87	29.92	— .04	71.2	— 2.3	91	4	82	53	30	61	31	66	64	82	5.58	+ 2.0	15	3,934	nw.	24	sw.	3	6	18	7	5.4
Davenport	606	71	79	29.28	29.92	— .05	75.3	— 0.1	95	5	84	57	3	67	26	69	66	75	7.13	+ 3.6	12	4,492	sw.	27	s.	15	15	13	3	4.2
Des Moines	861	84	101	29.04	29.93	— .03	75.2	— 0.3	94	5	85	58	1	66	26	68	64	71	10.20	+ 6.3	16	5,190	sw.	36	w.	4	5	23	3	5.2
Dubuque	698	100	117	29.20	29.93	— .04	73.6	— 1.1	93	5	83	55	2	64	27	67	64	73	5.15	+ 0.8	14	4,265	nw.	26	sw.	21	12	15	4	4.5
Keokuk	614	64	77	29.28	29.94	— .04	76.6	— 0.4	94	8	86	58	27	68	25	69	66	76	6.26	+ 2.2	14	4,017	sw.	21	nw.	20	20	11	0	3.0
Cairo	356	87	93	29.60	29.97	— .03	80.2	+ 1.6	97	25	89	61	4	71	27	72	70	76	3.92	+ 0.5	10	4,950	sw.	54	nw.	19	19	8	4	3.7
La Salle	536	56	64	29.38	29.94	— .03	74.2	— 1.1	92	5	84	49	3	65	31				5.94	+ 2.7	16	4,442	sw.	30	nw.	6	10	14	7	5.0
Peoria	609	11	45	29.30	29.95	— .03	74.2	— 1.2	92	5	84	50	3	64	30	68	66	77	4.89	+ 1.9	17	4,190	sw.	36	sw.	10	18	8	5	3.5
Springfield, Ill	644	10	92	29.28	29.95	— .03	77.4	+ 0.9	97	5	87	55	3	68	28	69	65	71	6.70	+ 3.8	16	5,169	sw.	36	nw.	25	10	15	6	4.8
Hannibal	534	75	109	29.38	29.94	— .04	77.0	— 0.4	95	25	86	58	3	68	27				6.21	+ 2.5	14	5,879	sw.	56	ne.	23	11	14	6	4.5
St. Louis	567	208	217	29.35	29.95	— .04	78.9	— 0.2	96	25	87	60	27	70	24	71	68	72	3.32	— 0.1	10	7,089	w.	38	w.	14	14	12	5	4.5
																		70	4.73	+ 0.9										4.3
Missouri Valley.							75.1	— 0.7																						
Columbia, Mo	784	11	84	29.14	29.94	— .04	77.0	— 0.4	96	25	87	57	12	67	29				5.49	+ 1.8	13	4,595	sw.	28	nw.	18	16	10	5	3.5
Kansas City	963	116	181	28.96	29.96	— .01	78.5	+ 0.9	98	25	87	63	27	70	22	69	66	69	7.53	+ 2.7	12	8,416	s.	38	n.	30	16	13	2	3.4
Springfield, Mo	1,324	98	104	28.60	29.97	— .01	77.8	+ 1.4	96	24	87	60	12	69	24	69	66	70	2.15	— 2.6	5	5,709	sw.	33	sw.	15	26	2	3	1.7
Iola	984	40	47	28.93	29.95	— .02	78.8	+ 0.7	98	25	89	60	12	69	26				2.34	— 1.6	7	5,290	sw.	25	sw.	14	14	11	6	4.2
Topeka		85	89				78.7	+ 1.1	100	24	88	61	12	69	26				4.25	— 0.6	8	6,174	s.	25	sw.	21	18	8	5	3.5
Lincoln	1,189	11	84	28.67	29.89	— .06	76.4	0.0	100	5	88	58	12	65	28	68	64	68	3.66	— 0.2	9	6,502	s.	52	n.	18	12	18	1	4.2
Omaha	1,105	115	121	28.76	29.91	— .04	75.8	— 0.7	97	5	85	61	11	67	28	68	65	71	6.45	+ 2.1	12	5,341	se.	48	n.	6	11	14	6	4.8
Valentine	2,598	47	54	27.28	29.95	+ .02	70.7	— 2.5	100	4	83	52	15	59	34	62	58	70	5.52	+ 2.1	12	6,772	s.	40	n.	20	10	20	1	4.2
Sioux City	1,135	96	164	28.74	29.92	— .03	73.0	— 1.2	98	4	83	53	2	63	32				5.78	+ 2.2	13	7,604	s.	48	n.	18	9	15	7	5.1
Pierre	1,572	70	75	28.30	29.94	+ .01	72.4	— 2.8	102	4	83	56	26	62	31	62	57	67	2.74	+ 0.4	15	5,855	se.	51	w.	4	10	13	8	5.0
Huron	1,306	56	67	28.57	29.95	+ .01	69.4	— 2.1	96	4	81	50	26	58	32	63	59	74	3.24	+ 0.3	16	5,972	nw.	50	ne.	20	10	13	8	5.0
Yankton	1,233	49	57	28.62	29.91	— .03	72.2	— 2.4	98	4	83	52	2	62	34				7.65	+ 4.1	16	4,541	nw.	44	nw.	18	4	16	11	6.5
							68.9	— 1.9										63	2.31	+ 0.8										3.9
Northern Slope.							65.8	— 2.3	88	26	79	43	1	53	36	57	52	66	1.46	— 0.5	9	5,002	nw.	35	w.	3	20	11	0	3.5
Havre	2,505	11	44	27.34	29.94	+ .03	71.0	— 1.9	102	3	85	50	14	58	42	60	54	60	1.55	+ 0.2	10	3,415	ne.	36	w.	20	20	10	1	2.8
Miles City	2,371	26	48	27.46	29.96	+ .04	64.4	— 2.2	86	11	78	43	16	51	34	52	45	58	1.28	+ 0.2	11	4,147	sw.	39	w.	20	10	17	4	4.6
Helena	4,110	8	56	25.84	29.97	+ .04	63.2	— 1.1	88	31	78	39	5	48	35	53	47	66	1.14	+ 0.3	12	3,659	w.	32	nw.	4	15	15	1	3.3
Kalispell	2,962	8	34	26.93	29.94	+ .01																								
Rapid City	3,234	46	50				66.3	— 1.1	91	4	80	43	16	52	40	55	49	64	3.56	+ 1.6	16	5,879	s.	38	ne.	31	7	16	8	5.3
Cheyenne	6,088	56	64	24.10	29.93	+ .01	65.8	— 2.2	91	23	83	38	16	49	42	53	44	53	0.51	— 0.4	4	2,824	nw.	30	nw.	12	10	20	1	4.1
Lander	5,372	26	36	24.69	29.92	.00													0.97		12		sw.							5.2
Sheridan	3,790	5		26.13	29.96		66.2		97	3	81	38	16	52	45															4.2
Yellowstone Park	6,200	11	48	23.96	29.98	+ .06	57.9	— 3.6	80	19	72	36	16	44	37	47	41	64	2.20	+ 1.0	16	4,624	sw.	38	sw.	20	9	20	2	2.4
North Platte	2,821	11	51	27.08	29.94	+ .01	72.8	— 1.1	98	4	85	55	2	61	34	65	62	72	6.79	+ 4.1	19	5,209	se.	48	nw.	18	25	2	4	4.0
							77.2	+ 0.6										62	2.64	— 0.4										
Middle Slope.							71.8	0.0	94	23	85	52	16	58	37	58	50	55	1.52	— 0.1	7	4,963	s.	33	n.	25	16	12	3	4.1
Denver	5,291	129	136	24.80	29.93	+ .02	74.4	+ 1.2	96	20	88	52	2	60	41	59	50	52	1.30	— 0.7	10	5,146	se.	48	w.	4	14	16	1	3.5
Pueblo	4,685	80	86	25.32	29.90	— .01	79.3	+ 1.2	102	24	91	57	12	68	39	68	63	64	5.91	+ 2.3	6	5,796	s.	26	ne.	18	8	22	1	4.5
Concordia	1,398	42	47	28.48	29.91	— .04	78.4	+ 0.7	100	25	90	62	12	67	30	67	62	66	1.96	— 1.4	7	7,387	se.	36	s.	13	15	12	4	4.3
Dodge	2,509	44	54	27.36	29.89	— .04	79.5	+ 0.5	98	25	90	61	12	69	28	69	65	65	3.37	— 0.2	8	6,014	s.	36	sw.	12	14	15	2	3.8
Wichita	1,358	78	86	28.55	29.94	— .02	79.6	— 0.2	97	26	90	62	6	69	28	71	67	71	1.20	— 2.4	6	10,189	s.	40	s.	15	17	9	5	3.5
Oklahoma	1,214	10	47	28.68	29.92	— .04	79.5	— 1.0										63	2.42	— 0.4										4.2
Southern Slope.							80.8	— 1.4	103	1	91	64	3	70	29	69	64	61	3.25	+ 0.8	6	5,698	s.	38	nw.	11	10	15	6	4.7
Abilene	1,738	45	54	28.16	29.92	— .01	76.0	— 0.1	99	25	89	55	1	63	36	65	60	66	1.49	— 1.7	7	9,606	s.	55	nw.	10	21	9	1	3.7
Amarillo	3,676	10	49	26.27	29.90	— .02	83.4	— 1.3	106	1	94	64	2	73	39				3.19	+ 1.0	6	6,962	se.	66	ne.	2	14	12	5	4.4
Del Rio	944	8	57	28.94	29.90	.00	77.9	— 1.0	97	10	92	56	7	64	36	65	59	61	1.74	— 1.7	7	3,843	se.	24	s.	14	13	16	2	4.1
Roswell	3,578	9	57	26.32	29.86	— .02	78.1	— 0.9										43	1.20	— 0.1										3.8
Southern Plateau.							81.4	+ 0.9	101	1	93	66	8	70	33	63	52	45	0.35	— 1.8	6	7,263	e.	40	w.	14	12	17	2	3.9
El Paso	3,762	10	110	26.15	29.80	— .04	68.0	— 0.7	84	19	81	50	15	55	32	54	45	51	1.46	— 1.3	14	4,990	ne.	33	e.	5	11	19	1	3.7
Santa Fe	7,013	33	39	23.36	29.86	— .02	64.1	— 0.9	88	2	79	39	16	49	44	50	42	56	3.22	+ 1.4	12	5,133	sw.	35	sw.	14	9	12	10	5.2
Flagstaff	6,907	8	57	23.45	29.86	+ .03	89.4	— 1.0	117	3	103	68	16	76	40	67	52	36	2.18	+ 1.1	8	3,648	e.	36	e.	21	14	15	2	3.5
Phoenix	1,108	50	56	28.66	29.77	— .01	89.2	— 1.7	114	1	103	62	15	75	40	70	60	44	0.02	— 0.1	1	5,412	sw.	26	se.	12	26	5	0	1.5
Yuma	141	16	46	29.61	29.75	— .01	76.5	— 2.0	95	22	92	54	1	61	38	54	35	27	T.	0.0	0	4,933	nw.	30	se.	19	27	3	1	1.7
Independence	3,910	11	42	25.94	29.84	+ .01	71.2	— 0.1										38	0.70	+ 0.2										2.9
Middle Plateau.							68.1	+ 0.6	96	31	86	43	15	51	42	51	39	45	0 23	+ 0.1	2	4,382	w.	28	sw.	14	24	7	0	2.1
Reno	4,532	56	63	25.47	29.89	+ .02	72.4	+ 5.9	88	23	85	52	15	60	31	49	27	21	T.	— 0.3	0	5,867	se.	29	w.	3	31	0	0	2.4
Tonopah	6,089	12	20	24.10	29.88		69.5	— 2.1	96	31	88	40	15	52	44	51	37	37	0.01	— 0.2	1	3,906	sw.	32	sw.	4	12	13	6	0.4
Winnemucca	4,344	18	56	25.60	29.91	+ .01	69.6	— 0.1	92	6	87	44	1	53	44	51	36	38	2.46	+ 2.2	3	8,699	sw.	50	sw.	14	14	11	6	4.2
Modena	5,479	10	43	24.63	29.85	— .01	74.6	— 1.6	95	22	87	52	16	62	32	56	44	37	0.19	— 0.4	4	4,606	se.	41	sw.	12	21	8	2	2.9
Salt Lake City	4,366	105	110	25.59	29.87	— .03	67.4	— 1.3	91	7	84	42	16	51	43	52	42	52	1.40	— 0.2	8	4,026	nw.	26	ne.	7	11	17	3	4.6
Durango	6,546	18	56	23.74	29.88	— .01	77.0	— 2.2	98	5	91	53	16	63	36	56	42	36	0.62	+ 0.1	5	3,678	e.	27	nw.	10	18	7	6	3.4
Grand Junction	4,608	43	51	25.37	29.87	— .02	69.9	— 0.4										47	0.68	+ 0.2										3.6
Northern Plateau.							65.1	+ 6.1	91	31	79	43	5	52	35	53	44	52	1.10	+ 0.7	11	4,626	nw.	28	n.	19	12	18	1	3.9
Baker City	3,471	48	58	26.44	29.97	+ .02	72.0	— 0.8	98	31	86	49	14	58	39	56	43	42	0.13	0.0	2	3,800	nw.	33	n.	20	13	17	1	3.6
Boise	2,739	78	86	27.11	29.94	— .02	74.0	+ 0.4	102	31	89	49	5	59	39				0.79	+ 0.4	5	3,758	e.	52	w.	3	14	13	4	3.7
Lewiston	757	10	51	29.12	29.91	— .04	69.2	— 2.0	94	31	85	43	16	54	42	52	40	43	0.36	— 0.3	7	4,867	se.	40	s.	3	11	14	6	2.3
Pocatello	4,477	46	54	25.49	29.91	— .01	69.0	+ 0.2	95	31	83	46	5	55	37	55	45	51	1.00	+ 0.3	5	3,828	ne.	30	sw.	3	11	14	6	4.6
Spokane	1,929	101	110	27.93	29.94	— .02																								
Walla Walla †	1,000	71	79															75	0.64	— 0.1										4.5
N. Pac. Coast Reg.							61.6	+ 0.4																						6.0
North Head		211	11	56	29.83	30.05	— .03	57.6	— 0.7	70	30	60	51	23	54	15	55	53	88	0.32	— 0.2	11	11,917	nw.	58	se.	3	7	11	13	4.5
Port Crescent		259	12	29	29.78	30.06	.00	55.0	— 1.3	39	30	62	39	5	43	38				0.58	0.0	2	3,363	nw.	13	w.	13	15	6	10	4.7
Seattle		123	185	224	29.92	30.05	+ .01	64.2	+ 0.7	91	30	74	51	15	54	31	57	52	69	0.71	0.0	4	4,943	w.	36	sw.	3	13	13	5	4.7
Tacoma		213	113	120	29.80	30.02	— .04	64.4	+ 1.0	92	30	75	50	5	54	33				0.99	+ 0.3	6	3,798	n.	24	sw.	13	14	12	5	4.2
Tatoosh Island		86	7	57	29.95	30.05	.00	54.8	— 0.3	74	30	59	47	19	50	24	53	51	90	0.38	— 1.4	6	8,316	sw.	40	s.	31	8	4	19	6.8
Portland, Oreg		153	68	106	29.85	30.00	— .05	67.9	+ 1.6	102	30	78	52	5	57	36	59	53	64	1.19	+ 0.6	4	4,759	nw.	20	w.	3	17	13	1	2.9
Roseburg		510	9	57	29.45	29.99	— .04	68.0	+ 1.9	100	30	84	44	4	52	42	57	50	63	0.32	0.0	4	2,844	n.	18	sw.	3	20	10	1	2.3

TABLE I.—*Climatological data for U. S. Weather Bureau stations, July, 1907*—Continued.

Stations.	Elevation of instruments.			Pressure, in inches.			Temperature of the air, in degrees Fahrenheit.									Mean wet thermometer.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.			Wind.					Clear days.	Partly cloudy days.	Cloudy days.	Average cloudiness during daylight, tenths.	Total snowfall.
	Barometer above sea level, feet.	Thermometers above ground.	Anemometer above ground.	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hrs.	Departure from normal.	Mean max. + mean min. ÷ 2.	Departure from normal.	Maximum.	Date.	Mean maximum.	Minimum.	Date.	Mean minimum.	Greatest daily range.				Total.	Departure from normal.	Days with .01, or more.	Total movement, miles.	Prevailing direction.	Maximum velocity. Miles per hour.	Maximum velocity. Direction.	Maximum velocity. Date.					
Mid. Pac. Coast Reg.							**65.8**	**— 1.0**										**61**	**T.**	**0.0**									**4.3**	
Eureka	62	62	80	29.96	30.03	— .02	56.5	+ 1.2	64	3	60	49	4	53	14	54	52	85	**T.**	— 0.1	0	4,496	nw.	29	n.	14	3	14	14	6.7	
Mount Tamalpais	2,375	11	18	27.52	29.96	+ .01	65.2	.....	86	18	74	46	15	57	27	53	42	48	0.00	0.0	0	8,802	nw.	56	nw.	6	26	3	2	1.3	
Point Reyes Light	490	7	18	29.42	29.94	.....	54.8	.....	73	2	58	50	16	51	23	...	...	...	0.00	—0.3	0	13,245	nw.	59	**nw.**	14	3	3	25	8.5	
Red Bluff	332	50	56	29.50	29.84	— .05	78.1	— 4.0	100	12	92	57	4	64	34	62	51	45	T.	0.0	0	2,826	se.	13	s.	19	25	6	0	1.5	
Sacramento	69	106	117	29.82	29.88	.00	70.7	— 1.8	93	5	85	54	16	57	36	60	53	60	0.00	0.0	0	6,545	s.	25	sw.	19	28	2	1	0.9	
San Francisco	155	200	204	29.79	29.96	+ .01	58.0	+ 0.7	78	2	64	50	18	52	26	54	52	86	**T.**	0.0	0	8,680	w.	31	sw.	21	5	17	9	5.0	
San Jose	141	78	88	29.80	29.95	.....	65.8	— 1.1	88	5	79	45	4	53	42	.....	.....	.....	**T.**	0.0	0	.....	nw.	.....	.....	.....	29	2	0	1.1	
Southeast Farallon	30	9	17	29.95	29.98	.....	54.6	.....	62	29	57	50	17	52	7	...	...	...	0.00	0.0	0	8,949	nw.	36	w.	25	4	2	25	8.3	
S. Pac. Coast Reg.							**71.2**	**+ 1.4**										**62**	**0.01**	**0.0**									**2.6**	
Fresno	330	67	70	29.51	29.85	+ .02	79.8	— 2.2	103	12	97	55	20	62	40	59	43	35	0.00	0.0	0	4,670	**nw.**	24	nw.	3	29	2	0	0.8	
Los Angeles	338	116	123	29.54	29.89	— .01	72.2	+ 4.8	103	4	84	53	17	61	35	62	57	68	0.00	0.0	0	4,732	w.	29	sw.	25	20	10	1	2.8	
San Diego	87	94	102	29.80	29.90	— .02	68.1	+ 1.2	81	1	73	59	17	63	19	63	60	79	0.03	0.0	1	4,425	nw.	20	s.	5	26	3	2	2.8	
San Luis Obispo	201	47	54	29.74	29.96	+ .01	64.8	+ 1.6	96	5	77	46	1	52	43	56	50	67	0.00	0.0	0	4,044	nw.	20	nw.	5	16	14	1	3.7	
West Indies.																															
Grand Turk	11	6	20	30.04	30.05	+ .03	83.8	.....	92	*	90	72	29	78	...	...	...	...	0.95	.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	
San Juan	82	48	90	29.95	30.03	+ .04	80.8	.....	89	25	86	72	2	76	14	75	73	76	4.29	— 1.4	16	10,035	e.	32	se.	28	16	10	5	4.0	
Panama.																															
Ancon	74	....	....	.....	29.84	.....	80.5	.....	95	23	88	71	15	73	21	...	...	...	4.28	.....	22	.....	.....	.....	.....	.....	1	8	22	...	
Bas Obispo	40	....	....	.....	29.84	.....	78.0	.....	90	23	84	69	8	72	20	...	...	...	8.25	.....	21	2,827	nw.	19	nw.	24	1	6	24	...	
Naos	.....	....	....	.....	29.84	.....	80.2	.....	92	27	86	72	13	74	18	...	...	...	4.03	.....	17	5,576	nw.	41	ne.	29	1	12	18	...	

* More than one date. † Record incomplete.

TABLE II.—*Climatological record of cooperative observers, July, 1907.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alabama.	°	°	°	*Ins.*	*Ins.*
Ashville	99	63	81.2	5.04	
Auburn	97	68	80.2	8.98	
Bermuda	99	64	80.5	5.28	
Boligee	102	64	82.6	3.49	
Bridgeport	....	.....	.....	5.72	
Calera	....	.....	.....	2.94	
Cedar Bluff	....	.....	.....	4.47	
Citronelle	101	66	81.6	7.09	
Clanton	100	65	80.7	3.90	
Cordova	98	61	81.4	3.45	
Dadeville	....	.....	.....	7.27	
Decatur	104	61	82.4	1.68	
Demopolis	....	.....	.....	5.98	
Eufaula	95	67	79.7	7.83	
Evergreen	100	65	82.0	5.83	
Flomaton	100	64	82.9	4.15	
Florence	99	59	80.2	6.12	
Fort Deposit	101	63	81.2	5.49	
Gadsden	101	61	81.2	6.88	
Good Water	102	65	81.5	2.92	
Greensboro	98[b]	68[b]	81.0[b]	6.80	
Guntersville	....	.....	.....	5.81	
Hamilton	....	.....	.....	4.16	
Highland Home	100	60	79.2	4.43	
Letohatchee	....	.....	.....	2.99	
Livingston	99	66	81.6	2.44	
Lock No. 4	101	65	81.3	3.78	
Lucy	98	62	79.6	10.09	
Madison Station	100	62	80.2	5.68	
Maplegrove	100	64	79.8	5.19	
Milstead	....	.....	.....	3.51	
Newbern	100	64	81.9	4.31	
Oneonto	97	62	79.4	4.60	
Opelika	96	65	80.7	5.64	
Ozark	97	66	80.6	7.16	
Prattville	96	65	80.8	3.09	
Pushmataha	103	65	81.5	8.33	
Riverton	100	56	79.2	4.18	
Scottsboro	90	62	78.6	3.02	
Selma	102	67	83.0	6.28	
Spring Hill	94	70	81.3	4.02	
Talladega	101	65	81.4	5.12	
Tallassee	....	.....	.....	4.99	
Thomasville	101	62	81.4	4.93	
Tuscaloosa	103	65	82.1	5.21	
Tuscumbia	100	63	81.5	2.94	
Tuskegee	101	68	82.4	5.88	
Union Springs	99	69	82.4	7.29	
Uniontown	101	63	82.2	2.90	
Valley Head	99	59	77.6	4.35	
Vienna	....	.....	.....	1.83	
Wetumpka	101	65	82.2	6.00	
Alaska.					
Chestochina	93	30	57.7	2.82	
Circle	96	40	61.6	1.36	
Fairbanks	82	38	59.6	1.51	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
***Alaska*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Fort Gibbon	88	32	57.2	2.58	
Fort Liscum	70	36	51.4	11.25	
Juneau	73	45	68.2	3.40	
Ketchumstock	81	26	53.6	1.60	
Killisnoo	68	42	54.1	3.05	
Loring	85	44	59.4	3.73	
Nome	66	34	50.0	2.08	
North Fork	84	29	54.4	1.57	
Rampart	85	35	58.1	2.29	
St. Michael	65	40	53.7	.....	
Sitka	75	44	54.4	4.66	
Teikhell	100	32	59 5	8.20	
Tonsina	87	38	57.6	0.14	
Arizona.					
Allaire Ranch	....	.....	.....	2.84	
Arizona Canal Co. Dam	120	64	90.6	1.13	
Aztec	122	65	100.2	0.27	
Benson	108	60	81.4	2.54	
Bisbee	97	56	73.5	4.62	
Bonita	....	.....	.....	3.27	
Bowie	108	61	83.2	1.42	
Buckeye	116	54	86.8	3.71	
Casa Grande	120	69	94.8	1.75	
Chlarsons Mill	85	40	56.8	2.60	
Clifton	....	.....	.....	0.75	
Cline	107	48	83.2	2.77	
Cochise[*l]	108	76	90.1	3.45	
Columbia	112	61	85.3	4.55	
Congress	109	65	85.3	3.15	
Douglas	108	59	80.0	2.66	
Dudleyville	107	63	83.1	2.63	
Fish Creek	....	.....	.....	1.66	
Flagstaff	88	36	64.8	3.67	
Fort Apache	96	50	73.2	2.19	
Fort Huachuca	101	50	72.4	4.18	
Fort Mohave	120	68	94.2	0.10	
Gila Bend	120	71	93.2	1.02	
Globe	107	61	82.6	1.73	
Grand Canyon	98	42	66.7	4.12	
Greaterville	106	58	76.6	4.52	
Greer	....	.....	.....	3.09	
Holbrook	103	49	76.5	3.09	
Huachuca Reservoir	.....	.....	....	9.27	
Intake	....	.....	.....	2.31	
Jerome	100	61	80.0	2.30	
Keams Canyon	92	44	70.2	0.38	
Kingman	109	49	81.7	0.20	
Maricopa	122	50	91.2	1.70	
Mesa	119	59	89.0	1.44	
Mohawk Summit	120	80	99.6	0.00	
Natural Bridge	.....	.....	.....	3.98	
Nutrioso	....	.....	.....	3.12	
Oracle	102	63	79.8	4.14	
Phoenix (Ex. Farm)	117	62	88.6	0.96	
Picacho[*b]	114	80	97.5	1.33	
Pinal Ranch	.....	.....	.....	2.60	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
***Arizona*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Pinto	.....	.....	.....	0.93	
Roosevelt	114	64	89.5	1.69	
St. Johns	96	45	71.5	1.70	
St. Michaels	94	47	69.6	1.92	
San Carlos	112	61	86.2	0.56	
San Simon	106	48	73.5	1.00	
Seligman	98	43	71.2	1.74	
Sentinel	120	72	92.7	1.51	
Showlow	.....	.....	.....	2.67	
Signal	115	65	91.6	0.30	
Silverbell	112	65	85.8	1.52	
Tempe	119	60	88.8	2.11	
Thatcher	108	54	81.0	1.73	
Tombstone	101	60	77.9	3.44	
Tucson	111	65	85.8	4.27	
Upper San Pedro	106	53	77.7	2.25	
Vail[*b]	110	78	93.2	1.16	
Walnut Grove	.....	.....	.....	2.40	
Willcox	103	52	77.6	3.39	
Williams	95	40	67.2	2.74	
Yarnell	.....	.....	.....	4.43	
Arkansas.					
Alicia	100	55	80.9	0.60	
Amity	98	58	79.9	2.60	
Arkadelphia	.....	.....	.....	0.69	
Arkansas City	.....	.....	.....	4.04	
Batesville	104	58	82.6	1.53	
Bee Branch	103	60	82.4	1.50	
Benton	106	60	83.8	2.92	
Bergman	102	54	78.0	2.38	
Booneville	102[k]	63[k]	83.8[k]	.....	
Brinkley	102	57	82.8	3.90	
Camden	96	59	80.7	1.78	
Center Point	101	59	82.6	1.70	
Clarendon	.....	.....	.....	2.34	
Conway	102	60	81.8	0.56	
Corning	97	57	80.0	4.06	
Dardanelle	.....	.....	....	0.16	
Des Arc	102[l]	59[l]	81.4[l]	3.28	
Dodd City	102	56	79.8	0.16	
Dutton	91	57	74.8	1.76	
Earl	104[f]	65[g]	83.6[g]	3.00	
El Dorado	102	63	83.0	1.01	
England	102	59	83.4	3.89	
Eureka Springs	101	60	79.6	2.33	
Fayetteville	99	59	78.9	0.52	
Forrest City	100	58	81.2	5.32	
Fulton	.....	.....	.....	1.20	
Hardy	101	59	80.5	2.50	
Heber	108	54	82.8	T.	
Helena	100	62	82.6	1.64	
Hope	104	60	83.4	1.61	
Hot Springs	99	55	79.6	1.42	
Jonesboro	101	53	80.4	0.95	
Junction	100	58	81.2	1.96	
La Crosse	105	60	83.6	0.85	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Arkansas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Lewisville	102	58	82.2	2.56	
Lutherville	101	57	79.8	1.75	
Luxora	.....	.....	.....	1.90	
Malvern	101	58	80.3	4.20	
Mammoth Spring	100	56	78.9	1.33	
Marked Tree	.....	.....	.....	5.25	
Marvell	103	57	82.6	2.21	
Mena	97	58	79.1	3.16	
Montrose	99	62	81.4	3.81	
Mossville	92	60	76.1	1.05	
Mount Nebo	94	60	79.1	0.82	
Newport	105	61	83.9	0.59	
Ozark	102	62	81.4	1.93	
Pine Bluff	102	60	82.8	1.84	
Pocahontas	101	58	82.8	1.47	
Pond	98	55	77.4	1.23	
Prescott	101	60	82.3	0.68	
Princeton	102	57	81.6	1.15	
Rogers	97	58	77.7	0.53	
Russellville	105	60	83.0	1.02	
Spielerville	103	61	82.2	1.31	
Stuttgart	104	55	82.0	2.35	
Texarkana	104	67	86.6	0.85	
Warren	102	59	82.6	2.51	
Wiggs	100	54	79.8	3.51	
Winchester	102	59	83.5	2.41	
California.					
Alturas	95	34	64.8	0.55	
Angiola	107	38	74.6	0.00	
Auburn	98	51	70.8	0.00	
Azusa	108	45	73.2	0.00	
Bagdad	116	76	96.3	0.00	
Bakersfield	110	60	85.6	0.00	
Bear Valley	.....	.....	.....	0.00	
Berkeley	81	51	62.2	0.00	
Bishop	95	45	72.0	0.00	
Blue Canyon	83	35	60.7	0.00	
Branscomb	89	44	65.0	0.16	
Brush Creek	96	44	69.6	T.	
Butte Valley	.....	.....	.....	0.64	
Calexico	112	62	88.1	0.00	
Campbell	87	43	64.4	0.00	
Campo	.....	.....	.....	0.00	
Cedarville	98	40	68.0	0.01	
Chico	106	52	78.2	0.00	
Claremont	110	48	76.0	T.	
Cloverdale	97	50	70.4	T.	
Colfax	98	48	73.1	0.00	
Colusa	96	60	78.6	0.00	
Crescent City	67	42	57.0	0.00	
Cuyamaca	87	43	66.0	0.00	
Delta	109	50	75.8	0.00	
Dimond	.....	.....	.....	0.00	
Dobbins	99	53	76.0	0.00	
Durham	101	53	76.2	0.00	
El Cajon	107	48	74.6	0.00	
Electra	101	57	78.4	0.00	
Elmwood	101	48	76.6	0.00	
Elsinore	116	46	76.4	T.	
Escondido	105	44	73.2	0.00	
Folsom	102	52	76.6	T.	
Fordyce	.....	.....	.....	0.13	
Fort Ross	71	47	59.2	0.00	
Georgetown	91	51	71.7	T.	
Gold Run	91	50	73.2	0.00	
Grass Valley	.....	.....	.....	0.00	
Greenville	92	35	63.3	0.81	
Hanford	107	44	74.2	0.00	
Healdsburg	99	45	69.3	0.00	
Heber	120	59	90.3	T.	
Hollister	96	42	64.9	0.00	
Idyllwild	96	38	66.7	0.05	
Indio	120	64	92.0	0.00	
Iowa Hill	90	53	70.9	T.	
Isabella	.....	.....	.....	0.00	
Jamestown	98	48	73.2	0.00	
Jolon	.....	.....	.....	0.00	
Kennedy Gold Mine	.....	.....	.....	T.	
Kernville	.....	.....	.....	0.00	
King City	95	42	66.6	0.00	
Laytonville	.....	.....	.....	2.35	
Le Grande	105	52	82.4	0.00	
Lemoncove	102	55	78.7	0.00	
Lick Observatory	80	49	67.1	T.	
Livermore	96	45	68.8	0.00	
Lodi	96	51	70.9	T.	
Lone Pine	96	46	71.8	T.	
Los Gatos	92	46	66.6	0.00	
Magalia	94	45	68.3	0.00	
Mammoth	123	66	96.1	0.00	
Marysville	100	74	86.6	0.00	
Merced	101	59	79.6	0.00	
Mill Creek	86	44	66.2	0.03	
Mills College	.....	.....	.....	0.00	
Milton (near)	98	54	75.4	T.	
Mojave	105	70	88.6	0.00	
Mokelumne Hill	94	50	74.0	0.03	
Mono Ranch	97	44	68.0	T.	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
California—Cont'd.	°	°	°	*Ins.*	*Ins.*
Montague	98	41	70.5	0.02	
Monterio	100	54	76.2	0.00	
Monumental	92	40	67.0	0.12	
Mount St. Helena	.....	.....	.....	0.00	
Napa	90	50	66.8	0.00	
Needles	115[f]	72[f]	94.4[f]	T.	
Nevada City	92	40	67.2	T.	
Newcastle	100	50	77.6	0.00	
Newman	106[e]	51[e]	78.6[e]	T.	
Nimshew	96	48	71.2	0.00	
North Bloomfield	89	40	65.8	0.02	
Oakland	82	51	63.0	0.00	
Ojai Valley	109	43	71.2	0.00	
Orland	108	55	80.3	0.00	
Orleans	109	48	78.8	0.49	
Oroville (near)	100	53	77.8	0.00	
Ozena	.....	.....	.....	0.00	
Palermo	102	51	76.3	T.	
Pilot Creek	.....	.....	.....	0.08	
Pine Crest	102	52	71.6	0.04	
Placerville	92	46	69.5	0.00	
Point Lobos	70	53	60.0	0.00	
Porterville	102	54	78.3	0.00	
Poway	106	47	75.4	0.00	
Quincy	87	36	62.4	T.	
Redding	98	58	77.8	T.	
Redlands	109	49	76.7	0.00	
Reedley	104	52	78.8	0.00	
Represa	91	57	73.1	0.00	
Rialto	106	52	77.2	0.00	
Riverside	110	52	76.0	0.00	
Rocklin	99	50	74.4	0.00	
Sacramento	90	53	69.4	T.	
Salinas	85	40	63.5	0.00	
Salton *[1]	117	80	92.6	0.00	
San Bernardino	111	46	76.0	0.00	
San Jacinto	111	44	77.3	0.00	
San Miguel	.....	.....	.....	0.00	
Santa Barbara	108	51	67.8	0.00	
Santa Clara College	90	42	66.1	0.00	
Santa Cruz	92	45	62.3	0.00	
Santa Maria	88[h]	48[h]	64.4[h]	0.00	
Santa Monica	87	49	64.0	0.00	
Santa Rosa	94	43	65.4	0.00	
Sausalito	.....	.....	.....	0.00	
Shasta	104	50	80.6	0.00	
Sierra Madre	104	54	75.2	0.00	
Sonoma	.....	.....	.....	0.00	
Sonora	96	53	73.6	0.00	
Stirling City	88	40	66.1	0.00	
Stockton	93	54	71.8	T.	
Storey	102	49	75.8	0.00	
Summerdale	82	49	65.2	T.	
Susanville	88	40	65.8	0.58	
Tamarack	86	28	53.6	2.40	
Towle	88	47	67.0	0.00	
Truckee	78	40	57.8	0.00	
Tulare	99	52	75.6	0.00	
Tustin (near)	.....	.....	.....	0.00	
Ukiah	101	43	70.4	T.	
Upper Lake	96	51	73.2	0.00	
Upper Mattole	.....	.....	.....	0.03	
Vacaville	97	49	72.2	0.00	
Visalia	104	44	75.0	0.00	
Wasco	106	50	80.7	0.00	
Wasioja	.....	.....	.....	0.00	
Westpoint	.....	.....	.....	0.07	
Wheatland	98	54	75.2	0.00	
Willows	97	54	75.0	T.	
Woodleaf	.....	.....	.....	0.00	
Woodside	85	45	64.2	0.00	
Yosemite	94	41	68.0	T.	
Colorado.					
Akron	.....	.....	.....	6.06	
Arriba	95	42	69.9	5.16	
Ashcroft	82	32	55.6	2.58	
Blaine	100	56	76.3	3.65	
Boulder	93	50	70.2	2.79	
Breckenridge	80	20	53.6	3.07	
Buena Vista	85	37	58.3	1.37	
Burlington	101	49	74.7	2.61	
Canyon	99	51	75.2	1.13	
Castle Rock	86	43[g]	60.9[g]	3.51	
Cheesman	90	41	66.7	4.11	
Cheyenne Wells	100	51	74.6	1.98	
Chromo	.....	.....	.....	1.22	
Collbran	93	45	68.6	0.83	
Colorado Springs	90	44	66.8	2.11	
Cope	99	42	74.2	1.96	
Corona	62	30	47.6	1.17	T.
Cripple Creek	.....	.....	.....	3.34	
Delta	100	47	74.0	1.29	
Eads	98	53	75.0	2.31	
Eagle	88	36	62.3	2.18	
Eureka	.....	.....	.....	1.70	
Fort Collins	94	45	67.8	2.28	
Fort Morgan	100	51	73.0	4.82	
Fowler	.....	.....	.....	2.34	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Colorado—Cont'd.	°	°	°	*Ins.*	*Ins.*
Frances	86	37	62.3	3.14	
Fruita	98[b]	43[b]	72.2[b]	1.35	
Garnett	85	38	61.4	1.23	
Gladstone	.....	.....	.....	3.53	
Gleneyre	.....	.....	.....	4.11	
Glenwood	93	38	65.3	2.41	
Gothic	77	30	52.8	1.64	
Grand Valley	97	42	71.0	0.85	
Gunnison	89	31	61.6	1.61	
Hamps	91	42	67.6	2.59	
Hoehne	99	42	70.4	2.22	
Holly	100	50	79.4	4.22	
Holyoke	100	50	72.4	1.81	
Idaho Springs	84	42	63.2	2.95	
Lake City	81	40	60.6	1.40	
Lake Moraine	73	29	53.5	5.03	
Lamar	101	56	77.7	6.09	
Laporte	.....	.....	.....	2.48	
Las Animas	106	52	78.0	5.15	
Lay	92	35	64.0	1.14	
Leroy	97	49	70.8	2.24	
Limon	95	49	70.2	1.97	
Longs Peak	80	31	54.8	3.50	
Lujane	93	47	71.0	0.66	
Manassa	85	39	63.2	1.20	
Mancos	90	40	66.0	0.93	
Meeker	88	36	63.0	2.41	
Moraine	83	35	59.8	3.10	
Nederland	.....	.....	.....	3.31	
Pagoda	88	36	63.2	1.85	
Pagosa Springs	87	31	62.5	2.77	
Paonia	98	49	73.0	0.83	
Platte Canyon	.....	.....	.....	1.80	
Power House	87	42	63.3	1.07	
Rangely	89	38	64.0	0.71	
River Portal	93	46	69.0	0.94	
Rocky Ford	97	51	74.4	4.96	
Saguache	90	40	63.7	1.50	
Salida	89	36	65.6	1.31	
San Luis	85	38	62.3	1.63	
Santa Clara	85	43	63.8	2.96	
Sapinero	81	35	58.6	1.17	
Sheridan Lake	103	52	71.7	2.24	
Silt	93	47	69.4	1.03	
Silverton	80	31	55.0	1.84	
Stonewall	.....	.....	.....	5.90	
Terminal Dam	.....	.....	.....	1.32	
Victor	81	44	60.8	3.14	T.
Vilas	.....	.....	.....	1.77	
Wagon Wheel Gap	83	27	56.0	.....	
Waterdale	93	44	67.5	4.64	
Westcliffe	87	37	62.2	1.70	
Whitepine	77	31	54.0	0.16	
Wray	99	55	74.6	3.39	
Yuma	.....	.....	.....	3.44	
Connecticut.					
Bridgeport	92	53	72.8	1.90	
Canton	90	45	70.5	1.45	
Colchester	90	45	70.0	1.70	
Falls Village	.....	.....	.....	3.21	
Hawleyville	92	45	70.4	2.13	
New London	90	54	72.4	1.90	
North Grosvenor Dale	92	48	70.7	1.30	
Norwalk	92	49	71.8	1.29	
Southington	89	45	70.6	1.15	
South Manchester	.....	.....	.....	3.73	
Storrs	89	48	69.4	1.45	
Voluntown	93	46	70.4	1.05	
Waterbury	94	46	72.2	2.29	
West Cornwall	89	52	69.0	2.10	
West Simsbury	.....	.....	.....	1.17	
Delaware.					
Delaware City	.....	.....	.....	4.47	
Dover	92	60	77.6	1.59	
Milford	96	55	77.0	3.22	
Millsboro	94	53	75.7	5.81	
Newark	90	54	74.6	2.95	
Seaford	91	55	74.8	3.92	
District of Columbia.					
West Washington	99	52	78.3	1.45	
Florida.					
Apalachicola	100	72	81.4	10.50	
Arcadia	96	68	82.2	7.02	
Archer	98	66	80.8	12.18	
Avon Park	94	68	81.4	8.50	
Bartow	97	67	81.7	10.24	
Bonifay	100	69	80.8	9.65	
Brooksville	95	67	80.6	8.81	
Carrabelle	98	70	82.6	5.70	
Clermont	98	69	82.3	12.27	
De Funiak	100	68	80.6	9.55	
Eustis	96	67	81.4	9.25	
Federal Point	98	65	82.2	9.36	
Fenholloway	99	67	81.1	9.51	
Fernandina	99	69	82.4	8.23	
Flamingo	97	71	84.7	5.07	
Fort Meade	95	67	80.2	10.91	
Fort Myers	90	69	80.4	6.70	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
***Florida*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Fort Pierce	97	67	80.4	4.47	
Gainesville	99	66	81.5	6.78	
Grasmere	97	70	83.0	.....	
Huntington	100	62	82.4	5.78	
Hypoluxo	99	68	81.6	5.52	
Inverness	93	68	80.2	8.28	
Jasper	97	63	83.0	4.53	
Johnstown	99[d]	61[e]	81.6[f]	7.63	
Kissimmee	96	68	82.0	12.51	
Lake City	99	67	81.4	6.39	
Macclenny	98	60	81.2	4.12	
Madison	99	69	82.2	4.41	
Malabar	99[g]	67	81.4[e]	7.51	
Manatee	96	68	81.0	6.46	
Marianna	100	67	81.0	7.95	
Merritts Island	94	71	81.5	9.63	
Miami	96	70	82.0	3.78	
Molino	101	62	80.2	12.11	
Monticello	96	67	79.3	7.64	
Mount Pleasant	100	66	80.4	15.07	
New Smyrna	98	67	80.8	8.67	
Ocala	99	68	81.6	8.06	
Orange City	99	65	81.5	4.59	
Orlando	97	68	82.6	9.96	
Panasoffkee	96	66	80.3	6.56	
Plant City	93	68	78.2	6.41	
Rockwell	97[d]	62[d]	81.2[f]	9.37	
St. Andrew	96	69	82.1	8.87	
St. Augustine	96	67	80.6	4.98	
St. Leo	95	67	81.1	5.14	
Switzerland	97	65	81.0	5.77	
Tallahassee	95	70	80.0	5.07	
Tarpon Springs	92	64	80.0	6.17	
Wausau	102	65	81.4	9.06	
Georgia.					
Abbeville	.....	.....	.....	5.72	
Adairsville	94[e]	66[e]	79.4[e]	5.01	
Albany	100	68	83.7	8.90	
Allapaha	100	66	82.5	4.30	
Americus	101	69	.....	6.08	
Athens	98	68	80.8	5.58	
Bainbridge	101	60	80.6	7.37	
Blakely	102	65	82.5	12.77	
Bowersville	100[g]	65[g]	80.5[e]	3.88	
Brunswick	101	60	83.2	3.42	
Butler	.....	.....	.....	8.20	
Camak	102	62	80.4	3.50	
Carlton	.....	.....	.....	2.73	
Carrollton	100	63	79.7	1.55	
Clayton	94	53	75.6	6.15	
Columbus	102	68	83.1	4.71	
Covington	.....	.....	.....	3.91	
Dahlonega	96	59	77.0	3.97	
Dawson	104	64	82.5	5.87	
Diamond	93	58	74.3	3.58	
Dublin	.....	.....	.....	4.89	
Dudley	99	66	81.8	3.52	
Eastman	106	66	84.5	7.39	
Eatonton	103	61	81.6	6.99	
Elberton	101	65	81.0	4.81	
Experiment	97	68	80.4	5.22	
Fitzgerald	100	67	82.0	8.51	
Fleming	102	62	83.4	8.94	
Forsyth	105	63	82.0	3.82	
Fort Gaines	95	68	80.6	7.54	
Gainesville	99	65	80.2	1.74	
Gillsville	100	64	79.2	6.13	
Glenville	100	68	83.4	4.60	
Greenbush	95	64	78.8	5.54	
Greensboro	102	62	81.8	4.95	
Griffin	100	66	80.8	6.64	
Harrison	102	60	80.9	3.65	
Hawkinsville	.....	.....	.....	3.92	
Helena	97	68	81.6	6.69	
Lisbon	104	67	82.9	3.39	
Lost Mountain	100	63	82.0	3.26	
Louisville	100	67	81.6	5.60	
Lumpkin	99	65	79.0	2.96	
Marshallville	102	62	82.2	5.59	
Mauzy	101	67	82.0	6.07	
Milledgeville	105	66	82.7	4.66	
Miller	104	63	82.8	8.19	
Montezuma	.....	.....	.....	7.24	
Monticello	101	66	82.2	5.12	
Morgan	98	66	80.4	5.65	
Newnan	102	66	81.7	4.41	
Oakdale	.....	.....	.....	3.76	
Point Peter	103	65	81.2	3.19	
Poulan	97	66	79.9	8.24	
Putnam	101	63	82.4	5.27	
Quitman	98	69	80.8	5.55	
Ramsey	97	64	80.4	4.23	
Resaca	.....	.....	.....	3.62	
Rome	102	65	81.4	2.54	
St. George	96	66	80.3	5.81	
St. Marys	99	67	82.4	8.50	
Screven	98[e]	66	82.8[b]	5.07	
Talbotton	99	65	80.4	5.00	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
***Georgia*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Tallapoosa	101	62	80.6	1.85	
Toccoa	95	62	77.9	4.33	
Valdosta	102	70	82.6	5.09	
Valona	98	65	81.6	3.84	
Washington	97	66	79.7	3.91	
Way Cross	102	66	83.8	3.59	
Waynesboro	97	68	81.4	6.34	
West Point	102	68	81.6	6.56	
Woodbury	100	63	79.7	5.16	
Idaho.					
American Falls	95	38	68.0	1.05	
Blackfoot	93	39	66.0	0.62	
Bonners Ferry	95	37	64.8	1.99	
Buhl	99	45	72.2	0.40	
Burke	83	33	56.4	2.27	
Caldwell	102	45	71.8	0.30	
Cambridge	104	49	72.7	0.40	
Chesterfield	91	29	62.6	0.28	
Dent	102	41	68.6	1.24	
Driggs	88	30	59.4	0.81	
Ellerslie	97	46	70.3	0.81	
Emmett	102	45	71.6	0.51	
Forney	90	28	59.0	3.23	
Grace	99	37	67.4	0.20	
Hot Springs	100	42	71.4	0.22	
Idaho Falls	94	39	65.8	0.62	
Kellogg	94	37	64.4	0.64	
Lake	78	38	58.0	T.	
Lakeview	87	39	64.0	1.45	
Landore	88	30	58.2	1.79	
Lardo	88	34	58.8	1.48	
Lost River	87	36	61.6	1.35	
Meadows	98	37	63.2	1.60	
Milner	95	40	70.0	T.	
Moscow	98	42	67.2	1.58	
Mountain Home	102	37	69.9	0.63	
Murray	92	35	63.2	1.13	
Murtaugh	94[e]	36[d]	67.8[e]	T.	
Nevens Ranch	.....	.....	.....	0.35	
Oakley	93	42	67.5	0.00	
Orofino	105	42	71.6	0.37	
Paris	89	30	60.6	0.12	
Payette	102	46	72.9	0.76	
Pollock	97	47	71.3	0.70	
Poplar	.....	.....	.....	0.57	
Porthill	90	42	64.8	1.57	
Roosevelt	79	35	54.4	2.52	
Rupert	98	43	70.4	0.26	
St. Maries	98	44	66.6	0.43	
Salem	.....	.....	.....	1.31	
Salmon	90	40	63.0	2.38	
Standrod	.....	.....	.....	0.71	
Twin Falls	97	37	67.8	0.15	
Vernon	98	35	65.5	0.60	
West Lake	.....	.....	.....	1.18	
Weston	91	35	65.0	0.25	
Illinois.					
Albion	98	54	78.8	3.92	
Aledo	91	53	74.2	6.74	
Alexander	95	52	76.4	8.57	
Antioch	90	42	72.2	2.02	
Ashton	89	46	71.4	6.98	
Astoria	92	51	73.4	7.38	
Aurora	90	40	71.8	5.51	
Beardstown	.....	.....	.....	5.06	
Benton	.....	.....	.....	1.05	
Bloomington	97	50	74.6	6.25	
Bushnell	95	54	76.2	7.16	
Cambridge	96	53	75.0	6.47	
Carlinville	95	52	77.4	5.59	
Carlyle	.....	.....	.....	4.36	
Carrollton	97	53	77.6	9.88	
Charleston	95	48	76.2	7.10	
Chester	102	57	81.2	4.83	
Cisne	98	53	79.8	4.88	
Coatsburg	94[f]	59[f]	75.9[f]	6.38	
Cobden	99	55	79.8	4.18	
Colchester	94	55	76.4	8.00	
Decatur	96	50	76.6	7.03	
Dixon	91	45	72.4	8.76	
Dwight	93	44	74.2	8.85	
Equality	103	55	80.6	1.96	
Flora	96	52	77.0	4.44	
Friendgrove	96	54	77.2	2.48	
Galva	94	51	74.2	5.23	
Greenville	94	54	76.2	5.27	
Griggsville	97	54	78.0	5.82	
Halfway	97	57	79.1	3.77	
Havana	98	57	79.0	6.23	
Henry	90	50	74.3	5.43	
Hillsboro	97	52	77.5	7.53	
Hoopeston	92	43	74.2	6.48	
Joliet	90	43	72.6	5.38	
Kishwaukee	91	45	72.4	5.07	
Knoxville	90	51	72.8	5.92	
La Grange	92	43	73.8	4.54	
La Harpe	92	54	74.8	6.70	
Lanark	91	45	71.8	3.72	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
***Illinois*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Lincoln	98	54	77.2	3.57	
Loami	.....	.....	.....	9.69	
McLeansboro	98	56	79.0	1.62	
Martinsville	101	50	77.5	4.98	
Martinton	95	43	73.2	5.65	
Mascoutah	100	51	79.1	3.61	
Minonk	92	47	74.6	5.72	
Monmouth	95	53	76.1	7.32	
Morrison	92	49	72.4	9.19	
Morrisonville	93	49	75.4	6.88	
Mount Carmel	.....	.....	.....	3.42	
Mount Vernon	101	55	79.2	3.98	
New Burnside	99	53	78.9	4.72	
Olney	97	52	78.2	7.08	
Ottawa	92	55	75.2	6.92	
Palestine	96	53	76.1	4.15	
Pana	93	52	76.2	5.93	
Paris	98[b]	49[e]	74.9[e]	.....	
Peoria	.....	.....	.....	5.23	
Philo	96	48	74.6	6.08	
Pontiac	92	48	75.6	5.66	
Rantoul	94	46	75.3	6.17	
Raum	96	57	78.3	3.70	
Riley	90	46	71.8	4.92	
Robinson	97	51	77.0	6.03	
Rockford	91	48	72.4	4.63	
Rushville	94	55	76.1	6.82	
St. Charles	91	42	73.0	5.45	
St. John	97	57	78.8	3.18	
Streator	93	54	75.7	7.61	
Sullivan	96	48	76.2	5.78	
Sycamore	93	43	73.0	4.99	
Tilden	99	50	79.0	2.60	
Tiskilwa	91	50	73.4	10.17	
Tuscola	96	47	76.2	5.49	
Urbana	93	48	74.2	5.41	
Vernon	96	50	78.2	4.56	
Walnut	94[d]	51[e]	74.2[f]	9.53	
Warsaw	.....	.....	.....	6.45	
Windsor	96	48	76.1	5.63	
Winnebago	91	43	71.8	6.65	
Yorkville	96	42	74.5	6.23	
Zion	92	48	71.9	6.91	
Indiana.					
Anderson	90	52	73.4	6.93	
Auburn	86	43	70.1	4.39	
Bloomington	94	55	76.7	4.35	
Bluffton	89	48	73.0	5.72	
Butlerville	95	50	75.8	3.69	
Cambridge City	93	48	73.0	4.56	
Columbus	95	50	76.2	4.62	
Connersville	94	50	73.9	3.82	
Delphi	93	45	73.6	6.43	
Elkhart	95	48	72.6	5.34	
Eminence	94	49	74.4	3.09	
Farmersburg	94[e]	51[e]	74.7[f]	6.28	
Farmland	89	48	72.6	5.25	
Franklin	95	51	75.6	3.11	
Greenfield	94	54	76.7	5.75	
Greensburg	95	51	75.1	5.48	
Hammond	90	45	72.2	3.78	
Holland	99	53	78.4	4.59	
Huntington	89	47	73.8	6.25	
Jeffersonville	99	55	79.8	4.94	
Judyville	93	46	74.9	4.81	
Knox	87	45	71.7	5.37	
Kokomo	90	45	72.7	4.88	
La Fayette	92	47	74.3	5.92	
Laporte	95	45	71.0	4.49	
Lima	85	44	70.5	6.68	
Logansport	93	46	75.2	5.79	
Madison	97	52	78.0	5.03	
Marengo	102	49	77.6	3.11	
Marion	91	48	74.2	3.97	
Markle	86	45	70.9	3.80	
Mauzy	92	48	78.6	6.71	
Moores Hill	95	52	75.7	3.39	
Mount Vernon	101	57	81.4	5.83	
Northfield	91	45	72.0	6.00	
Paoli	96	49	76.0	5.04	
Plymouth	86	43	71.2	4.22	
Princeton	99	52	78.2	3.67	
Rensselaer	89	45	72.7	5.50	
Richmond	92	48	73.2	7.06	
Rochester	88	50	74.2	4.61	
Rockville	92	50	74.1	5.16	
Rome	103	52	80.7	1.51	
Salamonia	90	44	72.0	7.80	
Salem	97	49	76.2	4.95	
Scottsburg	97	55	76.7	5.21	
Seymour	93	52	75.4	4.09	
Shelbyville	97[e]	50	75.1[d]	6.71	
South Bend	87	47	71.0	5.10	
Terre Haute	96	52	77.8	4.20	
Veedersburg	95	45	75.4	3.85	
Vevay	95	53	77.9	8.45	
Vincennes	102	53	79.7	3.47	
Washington	96	53	77.1	3.23	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Indiana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Worthington	96	51	76.6	5.17	
Indian Territory.					
Ada	98	64	81.3	1.37	
Ardmore	100	62	81.6	4.23	
Calvin	.....	.....	.....	1.02	
Chickasha	102[c]	59[c]	80.2[c]	1.64	
Durant	100	63	80.4	2.20	
Fairland	102	59	80.7	1.18	
Fort Gibson	.....	.....	.....	1.43	
Hartshorne	100	62	83.2	1.27	
Healdton	99	55	78.9	3.13	
Holdenville	101	61	80.8	0.97	
Idabel	102	63	84.0	3.64	
Marlow	99	61	79.9	3.36	
Muskogee	102	62	81.4	0.83	
Okmulgee	100	60	80.9	1.96	
Pauls Valley	101	57	79.8	1.85	
Ravia	100	64	81.0	3.15	
South McAlester	101[4]	63[d]	82.4[d]	2.50	
Tulsa	102	63	81.5	0.38	
Vinita	98[c]	62[c]	80.2[c]	1.06	
Wagoner	104	61	83.2	0.61	
Webbers Falls	101	58	80.4	2.04	
Iowa.					
Afton	96	53	76.2	5.96	
Albia	90	57	73.8	9.36	
Algona	92	53	71.6	6.75	
Allerton	93	56	74.9	9.12	
Alta	93	54	71.6	9.55	
Alton	97	41	71.4	5.36	
Amana	94	55	74.6	8.83	
Ames	96[c]	44	69.8[b]	5.32	
Atlantic	96	49	74.6	5.93	
Audubon	96	49	73.2	4.99	
Baxter	94	53	73.4	8.55	
Bedford	94	54	75.2	6.93	
Belle Plaine	89	55	70.5	13.66	
Bloomfield	94	56	75.9	12.96	
Bonaparte	90	57	74.6	7.64	
Boone	96	58	74.4	4.63	
Britt	91	50	72.8	8.31	
Buckingham	.....	.....	.....	6.92	
Carroll	94	50	71.8	7.52	
Cedar Rapids	97	52	75.2	8.14	
Chariton	92	54	74.2	5.08	
Clarinda	101	53	76.0	5.62	
Clear Lake	90	50	73.0	8.34	
Clinton	95	51	74.6	8.53	
Columbus Junction	92	57	74.4	5.88	
Corning	97	53	74.8	5.79	
Corydon	92	58	75.2	5.14	
Creston	93	55	73.6	6.64	
Cumberland	.....	.....	.....	10.76	
Decorah	93	53	72.5	4.35	
Delaware	94	53	73.0	7.48	
Denison	96	52	73.4	4.14	
De Soto	92	55	73.6	9.60	
Dows	91	53	71.7	7.87	
Earlham	92	49	73.5	8.47	
Elkader	96	51	74.0	3.97	
Elliott	98	55	76.4	13.52	
Estherville	94	46	69.2	6.73	
Forest City	90	54	71.6	6.64	
Fort Madison	.....	.....	.....	9.52	
Gilman	.....	.....	.....	6.20	
Grand Meadow	89	52	71.4	6.09	
Greene	95	53	72.8	6.71	
Greenfield	94	55	73.5	8.42	
Grinnell	92	56	74.5	8.88	
Grundy Center	95	55	74.3	6.67	
Guthrie Center	96	51	75.2	6.56	
Hampton	93	54	72.8	12.05	
Hancock	97	56	74.4	6.40	
Harlan	96	52	73.7	4.96	
Humboldt	91	44	71.5	9.36	
Independence	91	53	72.4	8.11	
Indianola	92	57	74.7	6.59	
Inwood	96	51	71.2	5.65	
Iowa City	94	56	75.2	9.21	
Iowa Falls	93	54	72.4	7.06	
Jefferson	96	54	75.0	4.07	
Keosauqua	95	55	76.0	9.24	
Lacona	.....	.....	.....	4.41	
Larrabee	96	54	73.4	4.69	
Le Claire	.....	.....	.....	7.14	
Le Mars	97	50	71.8	6.50	
Lenox	94	56	75.0	7.51	
Leon	95	50	76.5	7.84	
Little Sioux	97	54	74.6	8.29	
Logan	97	52	73.7	5.04	
Maple Valley	.....	.....	.....	7.83	
Marshalltown	93	53	73.4	7.56	
Mason City	92	55	73.6	11.20	
Massena	98	54	75.1	8.70	
Mount Ayr	96	51	75.4	8.70	
Mount Pleasant	92	57	75.6	7.41	
Mount Vernon	95	55	74.2	7.51	
Murray	95	54	75.2	11.65	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Iowa—Cont'd.	°	°	°	*Ins.*	*Ins.*
Muscatine	.....	.....	.....	7.97	
Nevada	.....	.....	.....	5.37	
New Hampton	88	52	70.7	7.22	
Newton	92	56	74.0	8.31	
Northwood	91[c]	54[c]	72.2[c]	5.05	
Odebolt	97	53	74.8	8.49	
Ogden	94	55	74.4	6.31	
Olin	91	53	73.6	6.90	
Onawa	96	57	75.2	5.31	
Osage	95	52	72.1	4.45	
Oskaloosa	90	55	74.2	4.49	
Ottumwa	96	58	76.9	10.04	
Pacific Junction	99	54	75.4	9.56	
Pella	93	57	76.6	6.37	
Perry	95	55	75.2	7.36	
Plover	95	50	71.4	5.44	
Pocahontas	95	53	72.4	8.82	
Ridgeway	93	51	72.9	5.96	
Rock Rapids	98	50	71.2	6.04	
Rockwell	94	53	74.7	4.59	
Sac City	92	53	72.2	7.56	
St. Charles	93	57	74.8	4.89	
Sheldon	98	51	72.8	4.77	
Sibley	95	50	69.5	6.59	
Sigourney	92	57	75.0	7.27	
Sioux Center	94	53	71.0	4.30	
Stockport	90	58	74.3	8.08	
Storm Lake	95	50	73.0	7.88	
Stuart	96	55	75.3	7.48	
Thurman	102	54	76.6	6.80	
Tipton	96	59	76.4	8.48	
Toledo	92	57	74.4	9.83	
Wapello	88	58	73.6	6.23	
Washington	91	57	73.6	6.75	
Washta	95	50	72.7	9.53	
Waterloo	95	56	74.4	4.80	
Waukee	97	56	74.6	9.78	
Waverly	90	55	72.0	9.43	
Webster City	97	53	75.0	7.70	
West Bend	92	53	72.0	9.70	
Whitten	95	55	73.8	4.64	
Wilton Junction	94	55	75.0	9.52	
Winterset	97	56	76.2	6.72	
Woodburn	92	49	74.2	6.32	
Zearing	94	52	73.6	5.27	
Kansas.					
Abilene	.....	.....	.....	3.34	
Alton	106	56	80.2	0.36	
Anthony	99[c]	60[c]	79.5[c]	7.39	
Ashland	103	61	78.7	7.49	
Atchison	99	60	78.8	5.20	
Baker	95	59	76.4	4.98	
Beloit	.....	.....	.....	3.60	
Blue Rapids	.....	.....	.....	3.15	
Burlington	100	58	79.0	3.00	
Cimarron	99	54	75.6	7.39	
Clay Center	106	55	79.9	2.20	
Colby	.....	.....	.....	0.82	
Coldwater	102	62	78.8	6.20	
Columbus	99	59	79.4	1.33	
Coolidge	103	56	77.6	4.02	
Cottonwood Falls	104	55	79.2	1.70	
Cunningham	99[c]	60[c]	77.4[b]	9.32	
Dresden	102	53	77.0	2.13	
Eldorado	99	57	78.8	2.04	
Ellinwood	101	58	78.4	5.63	
Ellsworth	101	54	78.4	2.65	
Emporia	102	60	78.4	2.85	
Enterprise	103	56	79.7	2.83	
Eskridge	101	61	77.2	2.98	
Eureka	.....	.....	.....	2.07	
Fall River	100	58	79.2	1.93	
Farnsworth	105	54	77.7	1.27	
Fort Scott	100	56	78.2	1.66	
Frankfort	105	54	79.3	3.21	
Garden City	103	61	80.8	6.35	
Garnett	96	59	77.7	3.71	
Goodland	102	53	77.4	2.39	
Gove[*1]	106	63	79.6	3.65	
Greensburg	101	61	78.4	5.85	
Grenola	97	60	78.0	2.25	
Hanover	104	55	79.6	4.13	
Harrison	101	53	77.6	1.57	
Hays	102	52	77.0	9.15	
Hill City	104	56	78.4	1.65	
Horton	99	59	77.4	4.27	
Howard	99	58	79.0	1.50	
Hoxie	103	55	78.0	3.44	
Hugoton	105	51	78.5	3.18	
Hutchinson	99	56	78.5	4.77	
Independence	.....	.....	.....	2.99	
Jetmore	102	59	79.2	4.99	
Jewell	104	55	79.4	2.05	
La Crosse	101[b]	59[b]	77.6[b]	5.88	
Lakin	104	57	78.6	6.76	
Larned	98	56	77.2	5.77	
Lebanon	104	58	80.6	T.	
Lebo	101	59	78.8	1.62	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Kansas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Liberal	103	60	78.4	3.50	
Macksville	98	56	76.4	7.85	
McPherson	102	61	79.6	3.83	
Madison	99	59	78.6	4.27	
Manhattan	104	55	79.5	6.30	
Manhattan Agr. College	99	54	78.8	6.46	
Minneapolis	103	56	78.7	3.72	
Moran	98	60	78.7	2.74	
Mount Hope	.....	.....	.....	3.77	
Neosho Rapids	.....	.....	.....	2.52	
Ness City	.....	.....	.....	2.59	
Newton	102	57	79.6	0.69	
Norton	102	52	77.0	1.90	
Norwich	.....	.....	.....	4.37	
Oberlin	.....	.....	.....	1.78	
Olathe	97	52	76.8	4.72	
Osage City	.....	.....	.....	3.59	
Oswego	99	60	79.4	2.54	
Ottawa	101	55	77.5	2.49	
Paola	101	59	78.2	5.60	
Phillipsburg	102	55	78.6	0.31	
Plainville	100	51	77.3	2.25	
Pleasanton	98	58	77.8	2.28	
Pratt	98	61	77.4	6.54	
Republic	101	53	77.8	3.98	
Rome	99	57	78.5	4.38	
Russell	101	56	77.6	6.76	
Salina	103	53	80.0	2.55	
Scott	101	59	77.4	3.61	
Sedan	98	60	79.3	2.09	
Toronto	102	58	79.7	1.77	
Ulysses	.....	.....	.....	3.79	
Valley Falls	95	58	77.0	7.65	
Wakeeney	104	59	77.4	4.03	
Wakeeney (near)	.....	.....	.....	4.15	
Wallace	106	50	77.2	1.95	
Walnut	99	60	78.3	2.15	
Winfield	100	59	79.8	3.15	
Yates Center	98	59	78.4	2.66	
Kentucky.					
Alpha	91	51	76.6	3.62	
Anchorage	96	48	77.2	6.44	
Bardstown	100	50	79.8	1.45	
Beattyville	96	49	76.0	5.64	
Beaver Dam	100	50	80.0	5.62	
Berea	97	40	76.8	2.88	
Blandville	98	55	79.2	6.26	
Bowling Green	100	52	81.2	6.19	
Burnside	100	50	79.2	3.44	
Cadiz	101	52	80.4	2.72	
Calhoun	100	54	80.4	3.99	
Catlettsburg	.....	.....	.....	7.16	
Earlington	100	48	78.3	1.44	
Eubank	96	47	76.2	4.25	
Falmouth	.....	.....	.....	7.97	
Farmers	95	46	75.6	6.54	
Frankfort	93	56	76.7	5.58	
Franklin	98	51	79.4	3.06	
Greensburg	98	45	76.8	5.31	
High Bridge	.....	.....	.....	3.90	
Hopkinsville	100	51	79.6	4.73	
Irvington	99	52	79.2	1.12	
Leitchfield	97	50	77.4	5.52	
Loretto	96	48	77.6	4.05	
Lynnville	98	55	80.0	6.29	
Marion	98	55	80.0	3.56	
Maysville	97	49	76.6	7.09	
Middlesboro	97	53	77.8	3.57	
Mount Sterling	94	50	76.8	4.29	
Owensboro	97	55	79.0	2.85	
Owenton	92	56	76.0	2.92	
Paducah	102	61	83.7	3.18	
Richmond	95	51	77.0	3.45	
St. John	98	48	75.8	3.72	
Scott	96	49	76.0	5.86	
Shelby City	95	46	75.1	4.21	
Shelbyville	95	46	76.4	5.40	
Taylorsville	97	48	77.4	3.73	
West Liberty	94	50	76.2	8.37	
Williamsburg	100	55	77.0	5.80	
Williamstown	93	54	75.0	6.14	
Louisiana.					
Abbeville	100	68	83.6	3.01	
Alexandria	104	66	85.0	3.77	
Amite	99	67	81.8	6.70	
Baton Rouge	101[4]	66	82.1[b]	4.95	
Burnside	97	67	81.4	4.05	
Calhoun	99	67	82.2	2.05	
Cheneyville	100	67	82.7	3.10	
Clinton	93	62	80.4	5.82	
Collinston	98	67	82.8	5.83	
Covington	97	66	82.5	4.83	
Donaldsonville	100	69	82.4	5.01	
Farmerville	99	65	82.7	2.27	
Ferriday	98	66	82.2	3.94	
Franklin	98	69	83.2	6.61	
Grand Cane	100	60	82.6	2.89	
Houma	96	68	81.4	5.62	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Louisiana—Cont'd.	°	°	°	*Ins.*	*Ins.*
Jennings	96	67	82.4	3.42	
La Fayette	97	67	82.0	3.13	
Lake Charles	100	65	82.8	2.55	
Lakeside	99	70	83.2	2.24	
Lawrence	97	69	82.2	2.75	
Libertyhill	99[c]	63[c]	82.6[c]	6.54	
Logansport	.....	.....	.....	2.40	
Melville	101	68[4]	82.8[b]	6.52	
Minden	106[c]	65[a]	84.6[b]	2.10	
Monroe	99	66	83.4	4.14	
Morgan City	.....	.....	.....	4.48	
New Iberia	94	71	81.9	6.71	
Opelousas	100	68	83.6	3.79	
Plain Dealing	102	58	83.2	2.58	
Rayne	98	70	83.0	3.23	
Reserve	105	68	82.8	3.08	
Robeline	102	60	82.3	3.00	
Ruston	99	69	82.2	1.00	
St. Francisville	99	70	83.6	1.25	
Schriever	99	67	82.0	8.92	
Simmesport	.....	.....	.....	7.00	
Southern University	.....	.....	.....	1.89	
Sugar Experiment Station	96	71	83.3	1.85	
Sugartown	97	69	83.1	3.69	
Maine.					
Bar Harbor	90	47	63.5	3.05	
Cornish	92	49	68.6	2.85	
Danforth	.....	.....	.....	4.27	
Debsconeag	.....	.....	.....	5.85	
Fairfield	93	50	68.2	5.36	
Farmington	93	45	67.1	4.59	
Gardiner	94	50	68.2	2.77	
Greenville	89[4]	42[a]	63.6[c]	5.81	
Lewiston	93	53	69.3	2.63	
Madison	93	47	66.8	7.34	
Mayfield	86	47	64.6	4.75	
Millinocket	106	45	68.8	4.70	
North Bridgton	94	50	69.4	2.95	
Orono	91	47	66.8	3.44	
Patten	95	42	64.8	4.21	
The Forks	.....	.....	.....	8.08	
Van Buren	94	43	64.2	5.90	
Winslow	92	47	66.0	5.26	
Maryland.					
Annapolis	92	60	76.2	5.09	
Bachmans Valley	91	50	73.3	7.83	
Cambridge	97	58	78.5	3.61	
Cheltenham	92	51	74.2	3.95	
Chestertown	88	56	74.7	4.67	
Chewsville	91	48	72.8	4.18	
Clear Spring	89	52	71.7	4.92	
Coleman	92	58	76.4	3.54	
College Park (Md. Ex. Sta.)	93	47	74.0	2.84	
Cumberland	99	50	76.0	3.54	
Darlington	90	55	72.6	3.51	
Deer Park	85	39	66.6	7.51	
Denton	93	52	75.8	2.75	
Easton	90	57	75.2	3.17	
Fallston	91	54	73.3	4.08	
Frederick	92	53	74.9	3.93	
Frostburg	.....	.....	.....	3.64	
Grantsville	83	47	67.5	7.07	
Great Falls	96	50	75.0	1.69	
Greenspring Furnace	93	49	73.4	5.96	
Harney	.....	.....	.....	4.29	
Jewell	92	57	75.1	2.20	
Keedysville	93	51	74.2	5.83	
Lake Montebello	92	55	74.7	5.29	
Laurel	92	56	74.1	3.01	
Monrovia	92	51	73.8	3.70	
Mount St. Marys College	90	55	73.9	5.84	
Oakland	85	41	66.7	7.91	
Pocomoke City	92	56	77.2	1.52	
Portobello	94	58	78.6	1.55	
Princess Anne	91	53	75.4	2.71	
Salisbury	95	53	77.4	3.18	
Solomons	93	62	77.4	2.24	
Sudlersville	92	54	75.5	3.05	
Takoma Park	91	54	73.7	2.15	
Taneytown	92	49	73.2	3.63	
Van Bibber	89	55	74.1	4.73	
Western Port	91	48	72.7	4.71	
Massachusetts.					
Amherst	90	54	70.3	3.87	
Bedford	85	62	68.1	2.72	
Bluehill (summit)	90	53	69.7	1.60	
Chestnut Hill	93	53	72.6	1.49	
Concord	89	46	69.8	2.52	
Fall River	88	55	71.2	0.88	
Fitchburg	89	50	70.8	3.44	
Framingham	91	46	69.6	1.71	
Groton	90	48	69.5	3.42	
Hyannis	.....	.....	.....	0.62	
Jefferson	.....	.....	.....	3.09	
Lawrence	92	53	71.6	4.64	
Leominster	.....	.....	.....	3.11	
Lowell	90	53	73.4	4.37	
Middleboro	90	47	69.9	1.09	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Massachusetts—Cont'd.	°	°	°	*Ins.*	*Ins.*
Monson	.....	.....	.....	2.65	
New Bedford	87	55	71.8	.....	
Plymouth	88	54	70.0	1.04	
Provincetown	88	54	69.2	1.24	
Salem	.....	.....	.....	2.91	
Somerset	100	54	76.4	1.17	
Sterling	.....	.....	.....	3.53	
Taunton	90	47	70.3	1.48	
Westboro	91	50	72.0	2.13	
Weston	.....	.....	.....	1.64	
Williamstown	85	45	68.6	3.96	
Winchendon	.....	.....	.....	5.69	
Worcester	91	54	71.9	2.37	
Michigan.					
Agricultural College	85	45	70.0	4.30	
Alma	88	43	69.2	2.32	
Ann Arbor	89	45	70.3	3.63	
Arbela	93	44	70.4	2.03	
Ball Mountain	85	42	68.2	3.57	
Baraga	.....	.....	.....	1.50	
Battle Creek	86	45	70.9	5.62	
Bay City	91	48	70.6	1.20	
Berlin	91	39	68.6	2.56	
Big Rapids	84	37	67.6	2.26	
Birchwood Beach	89	41	72.4	5.80	
Blaney	83	37	64.0	2.43	
Bloomingdale	89	44	70.8	3.34	
Calumet	84	44	64.0	1.34	
Cassopolis	87	47	71.4	6.60	
Charlevoix	88	50	67.3	1.69	
Charlotte	85	42	68.6	1.84	
Chatham	83	30	62.8	1.10	
Cheboygan	89	41	67.6	2.61	
Clinton	88	41	69.6	2.53	
Coldwater	87	43	70.3	3.22	
Concord	86	44	69.2	4.10	
Deer Park	79	40	60.7	2.15	
Detour	82	46	64.0	1.52	
Durand	89	44	71.5	4.49	
Eagle Harbor	80	42	62.1	0.67	
East Tawas	89[f]	42[f]	69.2[f]	1.13	
Eloise	89	43	70.8	1.47	
Ewen	86	31	61.7	.....	
Flint	88	43	69.2	2.60	
Frankfort	79	48	64.4	2.07	
Gaylord	84	48	67.4	.....	
Grand Marais	77	37	58.7	1.57	
Grape	89	44	70.8	2.89	
Grass Lake	88	43	70.0	5.64	
Grayling	86[d]	40[d]	66.2[d]	4.25	
Harbor Beach	91	38	66.2	0.90	
Harrison	87	38	67.6	1.70	
Harrisville	93	48	67.0	0.34	
Hayes[f]	87	42	68.8	.....	
Highland	.....	.....	.....	4.85	
Hillsdale	85	44	70.0	.....	
Holland	86	45	69.5	4.71	
Howell	87	46	69.9	3.47	
Humboldt	82	38	62.6	2.00	
Iron Mountain	86	42	66.4	1.04	
Iron River	84	31	63.0	3.74	
Ishpeming	79	36	61.7	3.20	
Isle Royal	67	38	51.5	4.67	
Ivan	88	40	67.9	2.01	
Jackson	92	46	72.4	4.53	
Jeddo	90	40	68.9	1.66	
Kalamazoo	85	49	70.6	7.00	
Kenton	84	31	61.8	0.10	
Lake City	90	37	67.0	.....	
Lansing	87	46	70.8	5.15	
Lapeer	88	42	70.8	2.70	
Ludington	85[d]	42[d]	67.6[d]	4.13	
Mackinac Island	81	48	64.3	3.15	
Mackinaw	85	46	67.4	2.00	
Mancelona	85	43	67.2	0.90	
Manistee	83	43	64.5	.....	
Maple Ridge	83	36	64.0	1.95	
Marlboro	98	35	70.0	2.10	
Menominee	87	44	67.5	1.62	
Midland	90[e]	45[e]	71.1[e]	0.77	
Montague	89	42	69.6	3.37	
Morenci	88	44	70.8	4.69	
Mount Pleasant	90	40	68.0	1.38	
Muskegon	81	42	68.0	3.71	
Old Mission	85	48	66.8	2.20	
Olivet	85	47	70.1	3.99	
Omer	88	44	67.6	.....	
Onaway	85	43	66.7	.....	
Ovid	89	43	70.0	4.82	
Owosso	89	44	70.8	3.52	
Petoskey	86	45	67.4	.....	
Port Austin	89	40	70.0	0.30	
Powers	89	38	65.0	.....	
Reed City	.....	.....	.....	1.42	
Roscommon	88	34	66.0	2.00	
Saginaw (W. S.)	92	46	71.2	1.39	
St. Ignace	81	48	64.4	2.95	
St. Johns	89	43	71.2	.....	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Michigan—Cont'd.	°	°	°	*Ins.*	*Ins.*
St. Joseph	99	50	71.3	5.28	
Saranac	90	45	70.6	5.23	
South Haven	81	45	65.3	.....	
Thomaston	86	30	61.9	1.01	
Thornville	85	43	68.6	2.89	
Traverse City	86	48	68.8	1.57	
Vassar	.....	.....	.....	1.95	
Wasepi	84	46	69.8	5.02	
Webberville	89	46	70.9	4.40	
Wetmore	84	30	60.2	3.50	
Whitefish Point	77	42	55.9	2.34	
Woodlawn	85	35	64.0	1.34	
Ypsilanti	90	44	69.8	3.50	
Minnesota.					
Albert Lea	.....	.....	.....	5.54	
Alexandria	86	50	67.0	2.68	
Angus	83	40	65.0	2.66	
Bagley	85	42	64.0	3.12	
Beardsley	91	46	68.7	1.95	
Blackduck	86	39	64.4	3.20	
Caledonia	90	49	70.8	5.84	
Campbell	88	45	66.8	1.88	
Cass Lake	.....	.....	.....	3.22	
Collegeville	88	52	69.6	1.53	
Crookston	85	50	67.6	2.38	
Detroit	88	40	65.8	3.77	
Fairmount	90	55	71.1	7.04	
Faribault	88	52	68.8	4.51	
Farmington	85	53	69.2	3.19	
Fergus Falls	92	53	70.0	3.39	
Floodwood	85	39	64.8	2.15	
Fort Ripley	90	48	70.4	2.66	
Grand Meadow	89	52	71.1	6.87	
Hallock	86	39	65.6	3.27	
Halstad	88	41	66.2	3.60	
Hinckley	88	42	67.1	3.13	
Hovland	87	39	61.9	3.80	
Lake Crystal	91	55	70.6	9.50	
Leech Lake	83	43	65.6	3.20	
Litchfield	87	49	67.8	1.74	
Little Falls	89	49	69.0	3.40	
Long Prairie	87	45	66.7	2.76	
Luverne	92	50	69.9	5.55	
Lynd	93	47	68.0	3.63	
Mankato	.....	.....	.....	5.57	
Maple Plain	90	51	70.2	2.61	
Milacca	97[c]	42[c]	67.3[c]	2.39	
Milan	89	49	68.2	1.64	
Minneapolis[*1]	90	51	70.3	4.53	
Montevideo	93	52	70.5	2.04	
Mora	87	44	66.2	2.79	
Morris	91	50	69.0	3.23	
Mount Iron	84	37	63.8	1.88	
New London	90	52	69.4	1.97	
New Richland	94	53	72.0	3.81	
New Ulm	97	54	73.3	4.04	
Osakis	86	51	68.2	2.95	
Park Rapids	86	45	67.4	1.58	
Pine River	85	41	67.5	2.03	
Pipestone	96	50	71.0	4.92	
Pokegama Falls	86	43	65.0	3.17	
Poplar	86	39	64.0	2.03	
Red Wing	.....	.....	.....	2.50	
Redwood Falls	95	53	71.0	3.52	
Reeds	.....	.....	.....	3.90	
St. Charles	88	45	69.7	3.59	
St. Cloud	89	50	69.3	2.22	
St. Peter	91	52	69.0	5.75	
Sandy Lake Dam	90	45	66.8	1.69	
Shakopee	88	54	70.0	4.13	
Stephens Mines	84	36	63.0	2.66	
Tonka Bay	.....	.....	.....	3.75	
Two Harbors	89	37	63.4	2.95	
Wabasha	92	48	72.3	2.98	
Willow River	94	39	66.1	3.00	
Windom	94	47	70.4	6.52	
Winnebago	95	52	72.2	5.84	
Winnebegoshish	83	47	67.2	4.35	
Winona	87	50	70.7	4.37	
Worthington	90	51	69.3	5.35	
Zumbrota	88	50	69.4	4.58	
Mississippi.					
Aberdeen	104	61	82.1	7.74	
Agricultural College	.....	.....	.....	2.72	
Austin	101	58	81.2	1.58	
Batesville	101	57	82.2	3.75	
Bay St. Louis	97	66	82.0	2.69	
Bellefontaine	102	58	80.6	1.51	
Biloxi	99	70	83.0	5.56	
Booneville	97	60	80.4	4.25	
Brookhaven	103	65	82.2	2.63	
Canton	101	63	81.3	4.47	
Clarksdale	99	57	81.8	1.30	
Columbia	.....	.....	.....	5.25	
Columbus	101	64	82.0	3.89	
Corinth	97	60	80.0	7.60	
Crystal Springs	97	63	81.2	8.47	
Edwards	97	67	81.7	7.41	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
***Mississippi*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
Enterprise				2.52	
Fayette	94	64	79.8	3.85	
Fayette (near)				4.12	
Greenville	98	63	82.2	2.27	
Greenwood	100	59	82.0	2.96	
Hattiesburg	102	63	82.6	13.16	
Hazlehurst	99	65	81.8	4.17	
Hernando	102	60	82.1	1.20	
Holly Springs	99	60	81.4	3.91	
Jackson	99	64	81.6	4.04	
Kosciusko	103	62	81.8	2.08	
Lake	98	62	80.7	5.29	
Lake Como	103	63	81.6	2.89	
Laurel	102	65	82.0	12.40	
Leakesville	101	64	82.2	9.36	
Logtown	98	65	81.8	2.40	
Louisville	99	63	81.3	3.40	
McNeill	98	68	81.8	6.11	
Macon	101	65	82.1	4.37	
Magnolia	102	66	82.2	7.29	
Monticello	101	64	81.6	8.84	
Natchez	100	65	83.0	4.19	
Okolona	103	62	82.0	3.67	
Pecan	98	67	80.4	4.16	
Pittsboro	103	60	80.9	2.47	
Pontotoc	98	60	80.0	1.65	
Porterville	100	64	81.4	4.86	
Port Gibson	99	61	80.8	3.10	
Quitman	99	62	81.1	3.19	
Ripley	102	62	80.0	2.90	
Shoccoe	104	62	81.8	5.64	
Shubuta				6.61	
Suffolk				7.63	
Swan Lake				1.85	
Tchula	100	60	81.4	2.72	
Tupelo	102	61	81.6	3.23	
University	100	59	80.6	3.65	
Utica	97	60	81.2	4.89	
Walnut Grove	96	62	79.9	2.98	
Water Valley	103	60	81.7	4.25	
Waynesboro	99	63	81.1	5.30	
Woodville	98	67	82.2	8.83	
Yazoo City	101	62	81.8	4.37	
Missouri.					
Appleton City	99	60	80.0	5.28	
Arlington				2.21	
Arthur	100	53	78.4	2.44	
Avalon	95	58	77.1	6.01	
Bagnell				2.54	
Belle				1.40	
Bethany	92	59	77.2	6.52	
Birch Tree	98	52	76.8	1.95	
Bolivar	98	56	77.8	2.32	
Boonville				6.02	
Brunswick	98	59	79.4	6.86	
Caruthersville	105	57	82.6	1.76	
Clinton	100	60	78.6	6.01	
Conception	94	58	75.8	4.34	
Darksville	92	57	75.8	8.12	
Dean	102	57	81.3	0.71	
Decaturville	101	55	78.0	2.61	
De Soto	99	56	78.4	5.32	
Doniphan	102	54	80.0	3.23	
Fairport				5.38	
Farmington	98	56	77.4	2.27	
Fayette	94	54	76.5	6.01	
Fulton	98	56	77.7	3.43	
Gallatin	96	60	78.4	4.32	
Gano	98	56	78.4	5.45	
Goodland	96	53	75.6	7.75	
Gorin				7.31	
Grant City	93	58	75.3	10.66	
Harrisonville	102	58	78.8	4.87	
Hazlehurst				4.96	
Hermann				6.45	
Houston	98	54	76.8	1.99	
Huntsville				7.20	
Ironton	102	53	77.8	2.98	
Jackson	101	54	80.0	2.66	
Jefferson City	98	58	77.4	3.64	
Kidder	94	57	76.6	3.76	
Koshkonong	99	59	79.1	1.67	
Lamar	98	60	78.8	2.07	
Lamonte				4.46	
Lebanon	100	58	77.9	1.08	
Lexington	99	59	78.2	7.37	
Liberty	95	60	76.6	8.34	
Lockwood	96	59	78.0	1.35	
Louisiana	96	52	76.6	6.34	
Marble Hill	101	53	79.0	4.42	
Marshall	95	60	77.0	5.51	
Maryville	98	58	77.0	12.37	
Mexico	98	51	77.1	7.45	
Monroe	96	54	76.0	5.20	
Mountain Grove	96	57	76.6	3.79	
Mount Vernon	100	56	77.8	4.94	
Neosho	96	54	77.6	2.57	
Nevada				1.38	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
***Missouri*—Cont'd.**	°	°	°	*Ins.*	*Ins.*
New Madrid				2.91	
New Palestine	97	59	79.3	6.55	
Oakfield	97	57	78.2	4.15	
Olden	100	57	78.3	1.62	
Oregon	98	58	77.4	6.05	
Osceola				4.84	
Princeton	100	56	78.6	7.69	
Rockport				10.32	
Rolla	97	58	77.8	3.26	
St. Charles	96	55	78.4	5.31	
St. Joseph				5.32	
Sikeston	100	54	79.6	2.68	
Steffenville	93	57	76.2	7.21	
Sublett	94	56	76.0	7.84	
Trenton	95	60	76.2	5.81	
Unionville	95	54	75.5	9.51	
Versailles	100	47	76.3	3.85	
Warrensburg	100	60	78.8	4.47	
Warrenton	97	56	77.9	4.89	
Warsaw	104	57	78.7	6.35	
Wheatland				3.80	
Willow Springs	100	55	77.7	3.06	
Windsor	96	60	77.4	3.11	
Montana.					
Absarokee				2.78	
Adel	81	37	59.2	1.92	
Anaconda	84	36	60.5	2.40	
Augusta	84	33	59.2	2.12	
Babb	78[a]	33[a]	55.8[a]	2.27	
Billings	94[b]	45[b]	69.2[c]	1.63	
Bozeman (Agr. College)	82	38	60.8	2.46	
Bowen	86	39	56.6	1.77	
Broadview	96	40	64.8	3.85	
Busby	96	42	65.2	0.96	
Butte	83	40	61.8	2.82	
Canyon Ferry	89	41	65.0	1.67	
Cascade	87	39	63.8	2.80	
Chester	85	40	64.0	0.77	
Chinook	91	42	67.4	1.08	
Choteau	86	40	62.8	1.37	
Columbia Falls	91	33	61.8	1.98	
Copper				3.02	
Crow Agency	93	47	68.4	2.05	
Culbertson	93	41	65.4	1.48	
Dayton	87	37	62.0	2.71	
Decker	99	47	72.6	2.00	
Dillon	85	40	62.4	2.85	
Ekalaka	96	40	66.7	2.86	
Ericson				2.89	
Evans	89	38	60.9	6.80	
Fallon	99	44	68.0	1.05	
Fort Benton	87	46	65.6	2.75	
Fort Logan	90	47	71.0	0.15	
Fort Shaw	87	42	64.0	1.70	
Fortine	87	31	59.2	1.97	
Glasgow	90	44	66.4	0.88	
Glendive	98[d]	46[d]	69.1[d]	1.07	
Gold Butte	82	24	55.8	1.77	
Graham				3.01	
Grayling	78	29	53.4	1.81	
Great Falls	88	46	65.4	2.09	
Hamilton	90	38	63.3	0.62	
Highwood				4.21	
Home Park				2.09	
Huntley	96	46	68.1	2.39	
Jordan[f]	93	40	66.3		
Lake McDonell	94[d]	37[d]	58.5[d]	2.15	
Lewistown	92	39	62.4	2.14	
Livingston	89	42	65.0	4.26	
Lodge Grass	94[g]	43[g]	67.0[g]	1.40	
Malta				1.46	
Marysville	83[e]	40[e]	59.6[e]	2.53	
Missoula	90	41	65.8	1.12	
Moore				3.64	
Norris	86	40	63.4	1.30	
Nye				3.31	
Ovando	86	35[h]	62.8[d]	0.56	
Philipsburg	83	30	60.2	2.32	
Plains	90	38	65.2	2.69	
Pleasant Valley	86	34	60.1		
Plentywood	99	34	67.2		
Polson	90	42	63.6	0.72	
Poplar	90	42	66.2	1.14	
Raymond				1.49	
Red Lodge	84	35	58.3	2.55	
Renovo	85	38	62.3	3.38	
Ridgelawn	95	38	62.7	2.92	
Saltese				1.42	
Snowshoe	82	38	59.1	1.68	
Springbrook	92	42	66.2	4.09	
Steele	84	43	64.1	2.74	
Tokna	95	44	67.6	1.27	
Townsend				1.75	
Tosten	85	38	62.7	1.58	
Troy	93	30	65.0	1.87	
Utica	83	40	61.0	3.51	
Valentine	91	42	67.0	1.79	
Wolf Creek	89	39	62.4	3.15	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Nebraska.	°	°	°	*Ins.*	*Ins.*
Ainsworth	100	50	72.3	6.45	
Albion	95[b]	49[b]	72.3[b]	5.22	
Alliance	99	45	70.4	1.15	
Alma	101	49	76.2	0.33	
Anoka	100	49	71.5	7.98	
Arapahoe				1.87	
Arcadia				5.13	
Ashland	97	58	75.8	7.11	
Ashton				2.87	
Atkinson	97	51	71.5	5.24	
Auburn	99	54	75.5	8.05	
Aurora	97	55	77.8	2.74	
Beatrice	98	54	77.6	6.83	
Beaver	101	54	78.2	0.85	
Bellevue	96	59	75.2	8.53	
Benkleman				3.60	
Blair	97	54	74.2	7.12	
Bloomfield	97	55	72.8	3.94	
Blue Hill				1.80	
Bradshaw				4.29	
Bridgeport	96	49	70.6	1.63	
Broken Bow	97	50	72.2	5.01	
Burchard				9.63	
Burwell				4.80	
Callaway	97	50	72.2	3.88	
Cambridge				3.21	
Central City				5.39	
Columbus	98	54	74.2	6.27	
Crete	100	56	76.1	6.55	
Culbertson	100	48	75.6	4.73	
David City	95	56	73.9	6.04	
Dawson	101	57	78.6	10.39	
Du Bois				6.79	
Duff				4.35	
Dunning				3.00	
Edgar				2.51	
Ellis				8.03	
Ericson				3.28	
Ewing	95	50	70.6	4.71	
Fairbury	100	54	79.8	8.12	
Fairmont	103	49	75.2	2.24	
Fort Robinson	95[i]	45	67.7[f]	0.97	
Franklin	104[c]	52[c]	78.0[c]	0.69	
Fremont	97	55	74.8	6.83	
Fullerton	98	54	74.4	6.98	
Geneva	99	52	76.4	1.13	
Genoa (near)	98	55	74.0	8.13	
Gering				1.93	
Gosper				2.25	
Gothenburg	101	53	75.0	2.33	
Grand Island	100	57	76.8	3.39	
Grant	98	48	71.9	2.70	
Greeley				4.75	
Guide Rock				4.06	
Haigler				4.80	
Halsey				4.34	
Hartington	103	54	72.2	6.94	
Harvard	97	53	74.3	4.47	
Hastings	98	56	76.2	2.37	
Hayes Center	100[c]	56[c]	74.2[c]	4.12	
Hay Springs	97	47	69.4	2.75	
Hebron	100	55	77.2	7.27	
Hendley				0.60	
Holdrege	103	55	77.8	2.15	
Hooper[a][j]	98	61	75.2	6.68	
Imperial	100	43	73.0	3.45	
Kearney	99	54	74.2	2.66	
Kennedy	100	37	69.2	2.68	
Kimball	98	51	70.9	3.51	
Kirkwood	102	50	71.2	7.38	
Leavitt	100	53	76.6	6.23	
Lexington	98	50	73.4	4.99	
Lodgepole[f]	92	50	68.6	2.10	
Loup	98	49	72.3	1.93	
Lynch	105	52	75.6	7.48	
McCook				3.28	
McCool				6.30	
Madison	96	47	73.1	6.00	
Marquette				5.09	
Minden	100	54	76.1	2.41	
Monroe				6.73	
Nebraska City	99	53	76.4	5.82	
Nemaha				14.30	
Norfolk	100	50	73.9	7.08	
North Loup	99	52	74.5	4.12	
Oakdale	98	51	72.8	5.15	
Oakland	98	53	75.2	4.79	
Odell				8.05	
Ord				5.07	
Palmyra[a][j]	96	62	76.3	4.60	
Pawnee City	100	54	77.2	9.33	
Plattsmouth				7.08	
Plymouth	98	53	76.6	6.13	
Purdum	104	50	73.8	3.65	
Ravenna	100	47	74.6	2.54	
Republican				0.35	
Rulo				11.50	
St. Libory				3.78	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Nebraska—Cont'd.	°	°	°	*Ins.*	*Ins.*
St. Paul	99	55	75.9	4.09	
Santee	100	53	74.8	7.54	
Schuyler				6.67	
Scottsbluff	98	47	70.4	2.77	
Seward	100	55	77.0	4.27	
Springview	99	50	70.9	9.35	
Stanton	99	51	73.8	6.33	
Strang				3.72	
Stratton				2.77	
Superior	101	55	77.8	2.63	
Syracuse				4.55	
Table Rock				13.11	
Tecumseh	100	53	77.4	7.15	
Tekamah	101	55	76.0	8.20	
Turlington	99	58	75.6	4.16	
University Farm	99	55	76.4	3.26	
Wahoo				8.70	
Wakefield	98	51	72.8	7.33	
Watertown				2.97	
Wauneta				3.59	
Weeping Water	99	53	75.6	6.12	
Westpoint	99	53	73.8	6.88	
Wilber				5.70	
Wilsonville				0.92	
Winnebago	99	49	72.2	6.89	
Wisner				4.70	
Wymore				10.05	
York	99	54	75.9	3.26	
Nevada.					
Amos	98	35	66.8	0.00	
Beowawe				0.00	
Carlin [1]	90	42	63.6	T.	
Carson Dam	96	49	73.2	T.	
Clover Valley	80	41	65.2	T.	
Columbia	92	51[c]	72.0[d]	T.	
Elko [1]	90	50	69.0	0.00	
Eureka	90	38	67.1	0.19	
Fallon	99	44	72.0	T.	
Fenelon [1]	95	46	70.8	0.08	
Fernley	100	47	74.4	0.05	
Geyser	92	33	63.4	T.	
Golconda	95	42	71.8	0.00	
Halleck [1]	92	38	65.4	T.	
Hamilton	89	38	62.0	0.60	
Hazen	98	50	75.6	0.00	
Humboldt [1]	101	55	75.9	0.00	
Leetville	99	45	73.1	0.00	
Lewers Ranch	89	42	65.0	0.16	
Logan	113	58	86.4	T.	
McAfees Ranch	96	30	62.3	T.	
Mina	98	48	74.8	T.	
Palmetto	90	36	63.8	0.18	
Paradise Valley				0.11	
Potts	92	34	63.8	0.35	
San Jacinto	92[c]	34[c]	64.8[c]	0.18	
Squaw Valley	100	27	66.8	T.	
Tecoma	99	39	68.7	0.02	
Wabuska	95	41	68.1	T.	
Wells				T.	
New Hampshire.					
Alstead	86	47	67.3	4.00	
Bethlehem				4.19	
Brookline	93	45	72.1	5.01	
Durham	92	49	69.4	2.19	
Franklin Falls	92	45	69.4	3.93	
Grafton	90	39	66.6	2.42	
Hanover	91	41	69.0	2.16	
Keene	92	41	68.6	5.85	
Nashua	93	48	71.8	4.68	
Newton	90	46	68.4	3.41	
Plymouth	93	42	69.4	2.91	
New Jersey.					
Asbury Park	88	57	72.1	4.06	
Bayonne	92	58	74.4	1.58	
Belvidere	92	52	73.9	3.58	
Bergen Point	91	56	73.8	1.69	
Beverly	92	53	74.2	4.60	
Bridgeton	95	54	76.0	2.72	
Burlington				3.62	
Canton				5.33	
Cape May C. H.	90	54	73.9	3.49	
Charlotteburg	91	44	70.0	1.35	
Clayton	91	53	74.0	2.30	
College Farm	93	51	73.0	6.42	
Culvers Lake				2.16	
Dover	92	48	71.4	2.71	
Elizabeth	93	59	76.0	1.26	
Englewood	89	57	73.4	1.35	
Flemington	94	52	74.1	3.74	
Friesburg	91	50	74.2	3.33	
Hightstown	92	52	74.0	3.40	
Imlaystown	94	53	74.2	3.04	
Indian Mills	94	51	74.2	3.06	
Jersey City	93	60	75.8	1.22	
Lambertville	92	53	74.0	3.34	
Layton	90	41	69.2	1.51	
Moorestown	90	53	73.3	4.45	
Newark	93	55	75.4	0.95	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New Jersey—Cont'd.	°	°	°	*Ins.*	*Ins.*
New Brunswick	92	50	73.0	4.58	
Newton	91	40	71.2	1.26	
Oceanic	92	57	73.7	3.08	
Paterson	93	55	74.8	1.86	
Phillipsburg	93	51	74.4	0.97	
Plainfield	92	52	72.0	2.26	
Pleasantville				1.73	
Rancocas				3.88	
Rivervale	93	46	70.4	1.45	
Somerville	94	52	74.2	4.33	
South Orange	91	54	72.6	1.30	
Sussex	88	48	71.2	2.00	
Trenton	92	56	74.0	3.74	
Tuckerton	92	53	73.8	1.13	
Vineland	93	53	75.0	1.78	
Woodbine	90	51	73.8	3.04	
New Mexico.					
Alamogordo	102	58	78.9	0.93	
Albert	100	59	77.8	2.07	
Albuquerque	101	49	73.6	0.93	
Alto				3.11	
Bellranch	100	54	77.5	2.60	
Bloomfield	102	44	76.3	1.01	
Cambray				1.72	
Carlsbad	104	58	79.8	1.71	
Chama	88	40	65.0	1.90	
Cimarron	89	45	67.2	2.70	
Cliff	103	49	75.8	3.41	
Cloudcroft	81	37[d]	58.4[b]	4.50	
Datil	94	41	67.2	0.80	
Deming	105	48	73.1	3.18	
Dorsey	89[b]	50[b]	69.3[b]	1.78	
Dulce	96	34	67.4	1.14	
Eagle Rock Ranch	87	45	68.1	3.08	
Elizabethtown	81	35	58.8	1.35	
Elk	93	52	70.6	1.73	
Espanola	95	40	71.0	2.31	
Estancia	92	40	68.6	0.56	
Fort Bayard	98	53	74.2	1.34	
Fort Stanton	92	45	69.6	2.74	
Fort Union	88	40	65.0	5.25	
Fort Wingate	91	50	68.2	1.48	
Frisco	101[b]	47[b]	72.8[b]		
Fruitland	97	50	74.6	1.52	
Gage	104	59	79.6	1.67	
Glen	101	59	78.7	5.36	
Hillsboro	95	58	76.0	1.04	
Hope				1.20	
Laguna	98	50	74.3	1.40	
Lagunita	102	52	75.3	2.77	
Lake Valley				1.61	
Las Vegas	95	42	69.4	5.57	
Logan	100	58	78.2	1.05	
Lordsburg	107	60	80.8	2.20	
Los Alamos				3.15	
Los Lunas	100	52	76.6	0.40	
Magdalena	93	49	69.6	3.09	
Manuelito				1.80	
Mesilla Park	104	59	81.2	0.75	
Mineral Hill				2.90	
Monument	103	56	77.4	4.45	
Mountain Air	92	51	71.4	1.19	
Nara Visa	97	57	76.7	3.62	
Nursery Site	85	42	63.0	4.10	
Orange	106	55	79.6	1.56	
Red River				3.50	
Redrock				0.88	
Rincon	103	56	80.6	0.70	
Rociada	83	37	61.4	5.36	
Rosa				1.50	
Rosedale	89	52	69.4	1.37	
San Jon	101	54	79.1	1.19	
San Marcial	103	58	79.2		
San Rafael	95	50	72.0	1.04	
Socorro	104	50	76.6	1.22	
Springer	95	42	70.5	2.70	
Strauss				T.	
Taos	96	46	70.6	1.02	
Tres Piedras	86	39	63.0	2.20	
Tucumcari	99	57	78.8	2.56	
Valley				4.97	
Vermejo	88	38	62.3	3.60	
Winsor	86	39	58.1	4.17	
New York.					
Adams	87	49	69.2	3.52	
Addison	91	40	70.0	3.82	
Allegany	90	42	68.1	2.70	
Amsterdam	88	48	69.2	4.79	
Angelica	89	35	66.2	2.66	
Appleton	90	47	69.2	2.11	
Athens	90	50	72.1	2.03	
Auburn	88	48	69.6	3.96	
Avon	89	45	69.4	1.45	
Baldwinsville	90	48	69.8	3.44	
Ballston Lake	88	49	68.6	3.98	
Bedford	91	49	72.2	1.60	
Blue Mountain Lake				2.86	
Bolivar	89	36	66.8	2.36	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
New York—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bouckville	85	51	65.8	6.66	
Brockport	88	45	70.4	2.26	
Cape Vincent	85	47	67.8	2.70	
Carmel	92	58	73.0	2.06	
Carvers Falls	89	37	67.6	3.75	
Chatham	92	46	71.6	3.34	
Chazy	90	47	69.0	4.55	
Cooperstown	84	45	66.9	6.33	
Cortland	86	40	69.0	5.64	
Cutchogue	91	53	72.4	0.61	
Dannemora	86	47	66.5	3.29	
De Ruyter	89	40	65.8	5.70	
Easton				4.36	
Elba	84	44	67.9	3.93	
Elmira	92	41	72.4	2.54	
Fayetteville	90	46	71.0	4.23	
Fort Plain	88	49	70.3	5.55	
Franklinville	86	37	65.8	3.60	
Gansevoort				3.95	
Glens Falls	90	48	69.6	2.39	
Gloversville	85	45	67.6	3.20	
Greenfield	89	48	69.1	3.65	
Greenwich	88	47	68.9	2.17	
Griffin Corners	85	36	64.2	2.63	
Harkness	91	49	68.5	2.95	
Haskinville				3.66	
Hemlock	85	47	69.1	2.09	
Hunt	92	45	70.2	1.97	
Indian Lake	90	32	66.4	2.25	
Ithaca	89	43	69.7	1.95	
Jamestown	88	47	69.0	4.32	
Jeffersonville	91	40	67.6	2.23	
Keene Valley	93	40	67.2	2.25	
Kings Ferry				2.85	
Lake George	93	47	69.8	3.64	
Le Roy	85	46	68.4	2.66	
Liberty	85	47	67.0	3.04	
Little Falls City Res.	85	47	68.0	4.81	
Lockport	86	45	69.0	2.68	
Lowville	86	42	66.8	2.31	
Lyndonville				1.64	
Middletown	89	53	71.8	2.70	
Mohonk Lake	84	53	68.6	2.84	
Moira	88	47	68.8	2.78	
Mount Hope	93	49	72.2	1.16	
Newark Valley				4.50	
New Lisbon	84	38	64.0	5.65	
North Hammond	89	42	69.3	1.15	
North Lake	84	40	64.7	4.08	
Norwich	86	43	67.8	5.06	
Ogdensburg	88[d]	48[d]	68.4[d]	2.06	
Oneonta	89	45	69.6	4.06	
Oswegatchie				1.80	
Otto	86	45	68.2	3.48	
Oxford	84	44	67.8	3.22	
Palermo				2.22	
Penn Yan	89	45	69.8	1.89	
Perry City	90	35	67.4	1.92	
Philadelphia	86	44	68.1	2.04	
Plattsburg	88	52	68.5	2.50	
Port Jervis	89	48	71.2	2.95	
Richland	86	55	70.4	2.98	
Rose	90	45	68.9	3.08	
Salisbury Mills	92	49	72.2	2.63	
Saranac Lake	87	40	65.4	3.71	
Scarsdale	88	53	71.1	0.88	
Setauket	88	52	72.0	1.07	
Shortsville	87	49	69.4	2.64	
Skaneateles				3.32	
Southampton	86	54	70.2	0.99	
South Canisteo	88	36	66.4	4.16	
Spier Falls	90	47	69.2	2.78	
Taberg	89	41	68.0	4.49	
Ticonderoga	95	38	69.6	3.83	
Volusia	85	46	66.4	2.27	
Wading River	92	48	71.3	5.12	
Wappinger Falls	88	54	72.1	3.24	
Warwick				1.34	
Watertown	85	47	68.6	2.44	
Waverly	90	38	70.0	2.76	
Wedgwood	87	47	68.6	2.55	
West Berne	89	44	67.2	4.67	
Westfield	85	47	68.2	2.98	
Windham	87	42	66.2	3.41	
Youngstown				1.61	
North Carolina.					
Beaufort	96	66	80.5	2.87	
Brewers	96	58	76.2	4.10	
Buck Spring				2.55	
Carl	102	53	79.2	3.55	
Caroleen	99	61	79.8	2.90	
Chalybeate Springs	100	50	79.4	2.16	
Eagletown	96	57	78.6	5.35	
Edenton	96	58	78.2	9.40	
Fayetteville	96	60	79.4	3.34	
Goldsboro	101	56	81.1	5.50	
Graham				3.78	
Greensboro	99	59	80.0	3.12	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
North Carolina—Cont'd.	°	°	°	*Ins.*	*Ins.*
Greenville				6.41	
Henderson	93	62	77.7	4.83	
Hendersonville	93	56	74.5	2.91	
Horse Cove	89	58	72.8	5.22	
Hot Springs	98	56	77.8	5.90	
Kinston	102	58	81.3	9.11	
Lexington	100	60	80.0	1.24	
Lincolnton	97	60	77.4		
Louisburg	96	57	79.6	4.11	
Lumberton	100	59	80.8	6.87	
Manteo	95	59	78.4	8.35	
Marion	100	59	77.0	6.13	
Moncure	101	53	80.0	2.00	
Monroe	100	55	78.0	5.84	
Morganton	96	58	76.4	5.76	
Mount Airy	97	52	76.1	3.73	
Mount Holly				6.32	
Murphy				5.20	
Nashville	100	53	80.2	4.48	
New Berne	99	59	79.9	9.82	
Patterson	90	54	72.7	5.90	
Pinehurst	99	60	80.2	7.62	
Ramseur	100	52	79.2	2.49	
Randleman				2.84	
Reidsville	100	58	79.4	4.55	
Salem	97	56	78.0	2.25	
Salisbury	99	59	78.2	3.58	
Sapphire	88	47	69.0	5.18	
Saxon	96	50	74.5	4.47	
Scotland Neck	98	57	79.4	5.03	
Selma	100	53	81.2	5.34	
Settle	100	55	77.0	3.40	
Sloan	98	57	79.0	5.76	
Snow Hill	100	56	80.2	4.77	
Southern Pines	100	62	80.6	4.62	
Southport	95	64	80.6	5.67	
Statesville	99	60	77.5	2.02	
Tarboro	99	56	81.3	5.20	
Vade Mecum	95	51	74.8	3.33	
Wash Woods	98	66	81.3	3.03	
Waynesville	86	51	70.8	7.08	
Weldon	98	57	80.6	3.20	
Whiteville	100[d]	57[d]	80.6[d]	4.94	
North Dakota.					
Amenia	92	42	67.8	1.89	
Aplin	96	47	66.2	2.51	
Beach	92	42	64.7	2.10	
Berlin	91	39	65.7	2.60	
Bottineau	87	41	63.8	2.72	
Buford	93	46	66.3	1.11	
Cando	87[e]	42[e]	63.6[e]	4.10	
Churchs Ferry	88	45	65.4	2.05	
Coal Harbor	92	45	66.0	3.52	
Cooperstown	87	45	66.4	2.79	
Crosby	92[e]	40[e]	63.6[f]	2.38	
Dickinson	93	45	65.4	4.82	
Donnybrook	87	40	63.2	4.26	
Dunseith	89	40	64.5	2.39	
Edgeley	91	41	67.8	2.77	
Edmore	85	31	61.8	3.01	
Flasher				3.00	
Forman				2.00	
Fort Berthold	94	43	67.2	1.27	
Fort Yates	98	42	69.5	5.64	
Fullerton	95	42	66.4	2.04	
Gladys	87	41	63.7	2.00	
Glen Ullin	100	44	67.2	5.13	
Goforth	94	43	66.6	5.43	
Grafton	87	44	66.9		
Granville	88[b]	42[b]	64.8[b]	2.93	
Hamilton	84[f]	47[f]	66.4[f]	2.52	
Hannah	84[d]	34[d]	62.8[d]	3.10	
Hillsboro	90	49	66.2	3.64	
Jamestown	94	41	68.2	3.56	
Kulm	94	42	66.0	2.45	
Langdon	83	39	63.2	2.26	
Larimore	87	42	66.4	4.14	
Lisbon	92	42	66.6	1.76	
McKinney	89	38	64.2	3.70	
Manfred	90	45	66.0	4.68	
Mayville	87	45	67.6	3.78	
Medina	91	34	63.1	5.50	
Medora	103	43	66.2	3.97	
Melville	98[f]	43[f]	68.1[f]	4.22	
Minot	91	45	66.0	3.10	
Minto	88	43	64.6	2.55	
Mott	100	41[f]	65.8[f]	3.61	
Napoleon	97	38	65.1	3.81	
New England	92	44[b]	64.3[b]	3.20	
New Salem	95	45	66.0	4.63	
Oakdale	94	48	67.9	2.40	
Oriska	87	45	66.7	3.45	
Palermo	91	41	61.8	6.20	
Park River	97	40	67.8	3.28	
Pembina	90	35	65.8	2.85	
Portal	85	40	61.8	2.44	
Power	91	40	67.4	1.77	
Pratt	96	43	64.4	4.91	

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
North Dakota—Cont'd.	°	°	°	*Ins.*	*Ins.*
Schafer	98	38	66.6	1.40	
Steele	94	45	68.4	4.96	
Towner	89	44	65.6	1.98	
University	85	42	66.7	2.93	
Valley City	91	43	67.8	2.97	
Wahpeton	87	45	66.8	2.89	
Westhope	88	43	63.8	1.41	
Willow City	93	42	65.6	2.05	
Wishek	93	45	66.2	3.55	
Ohio.					
Akron	88	42	71.4	2.64	
Amesville	93	42	75.0	8.00	
Bangorville	89	41	71.6	4.83	
Bellefontaine	88	45	72.0	9.47	
Benton Ridge	89	46	73.2	4.21	
Bladensburg	90	40	71.8	8.71	
Bowling Green	89	43	71.9	4.28	
Bucyrus	90	44	72.0	4.47	
Cadiz	89	48	72.4	8.83	
Cambridge	91	45	71.4	6.53	
Camp Dennison	96	48	75.4	7.11	
Canal Dover	91	42	71.4	4.08	
Canton	87	45	71.1	6.01	
Cardington	88	41	71.2	6.17	
Circleville	94	49	74.6	3.62	
Clarington	90	49	72.7	9.68	
Clarksville	93	50	74.8	4.76	
Cleveland	88	46	71.6	2.99	
Coalton	95	45	75.4	6.25	
Dayton	95	50	75.0	7.01	
Defiance	89	45	71.8	5.65	
Delaware	90	43	72.6	9.06	
Demos	88	48	71.6	9.06	
Findlay	92	47	74.0	2.87	
Frankfort	98	46	75.4	1.00	
Fremont	91	44	73.6	2.14	
Garrettsville	88	39	68.6	4.05	
Granville	92	43	72.8	5.34	
Gratiot	89	46	71.8	8.96	
Green	96	55	75.8	8.00	
Greenhill	87	40	68.4	5.27	
Greenville	92	48	74.2	2.95	
Hedges	89	44	71.2	5.37	
Hillhouse	86	40	68.9	4.06	
Hiram	86	44	70.0	3.60	
Hudson	92	38	70.6	2.48	
Ironton	96	50	76.3	8.33	
Jacksonburg	97	52	75.4	6.35	
Jeffersonville	91[d]	49[d]	73.7[d]	4.81	
Kenton	87	45	71.2	4.82	
Killbuck	88	41	71.8	5.14	
Lancaster	91	49	72.8	7.15	
Lima	88	49	72.6	5.52	
McConnelsville	92	47	72.8	10.79	
Marietta	90	53	74.4	10.37	
Marion	91	44	72.6	7.85	
Medina	89	39	71.6	1.90	
Milfordton	90	40	70.9	9.72	
Milligan	92	43	72.4	6.02	
Millport	87	44	69.5	3.72	
Montpelier	88	45	71.8	4.84	
Napoleon	91	46	72.4	4.34	
Nellie	86	45	71.2	5.12	
New Alexandria	93	46	73.9	7.07	
New Berlin	90	41	70.5	3.74	
New Bremen	91	48	73.0	4.51	
New Richmond	94	52	75.6	4.33	
New Waterford	89	44	70.0	3.12	
North Lewisburg	92	43	74.6	6.35	
North Royalton	87	38	70.1	2.65	
Norwalk	89	40	71.6	2.47	
Oberlin	90	37	71.6	2.32	
Ohio State University	90	48	73.2	4.35	
Ottawa	88	45	72.4	4.65	
Pataskala	90	45	72.4	8.53	
Philo	89	48	72.6	11.29	
Plattsburg	90	47	73.0	6.91	
Pomeroy	95	51	75.3	4.21	
Portsmouth	95	50	75.6	6.53	
Pulse	91	48	73.0	2.59	
Rittman	91	38	71.2	3.00	
Rockyridge	91	44	72.4	4.81	
Rome	89	42	68.6	5.59	
Shenandoah	88	39	70.0	3.09	
Sidney	91	50	74.4	5.83	
Somerset	93	49	74.6	7.24	
South Lorain	89	39	71.0	2.90	
Springfield				5.07	
Summerfield	92	45	72.1	9.22	
Thurman	93	50	75.0	4.79	
Tiffin	88	47	72.7	3.39	
Toledo (St. Johns College)	88	51	72.8	2.10	
Upper Sandusky	88	44	72.4	3.66	
Urbana	93	47	73.5	9.17	
Vickery	95	40	72.0	2.87	
Warren	92	43	70.9	3.76	
Wauseon	90	42	71.7	3.60	
Waverly	97	46	75.7	4.34	

Stations.	Temperature. (Fahrenheit.)			Precipitation	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Ohio—Cont'd.	°	°	°	*Ins.*	*Ins.*
Waynesville	93	48	73.0	3.12	
Wellington	90	39	72.4	2.28	
Willoughby				2.06	
Wilson	94	43	74.4	4.71	
Wooster	88	40	69.9	3.96	
Zanesville				9.39	
Oklahoma.					
Alva	102	61	79.7	5.77	
Arapaho	101	59	79.8	0.29	
Beaver	105[b]	61[b]	79.3[b]	2.90	
Buffalo	104	60	82.2	4.18	
Chandler	105	60	82.8	1.01	
Chattanooga	103	60	81.6	1.50	
Cloud Chief	103	60	81.7	0.12	
Dacoma	101	63	79.6	4.61	
Enid	103	61	80.0	6.73	
Erick	103	60	79.8	0.84	
Fort Reno	95[b]	60	79.0[e]	1.86	
Fort Sill	100	60	80.8	1.40	
Frederick	102	65	81.6	2.50	
Gage	102	60	79.0	2.11	
Grand	90	58	74.8	2.49	
Guthrie	98	62	80.8	2.20	
Harrington	96	59	76.5	3.03	
Helena	100[b]	61[b]	79.2[b]	5.10	
Hennessey	102	61	81.4	1.58	
Hobart	99	62	81.4	0.20	
Hooker	101	59	79.0	1.96	
Jefferson	99	62	80.2	7.56	
Kenton	100	54	77.0	2.43	
Kingfisher	101	61	80.2	1.83	
McComb	99	63	81.8	0.95	
Mangum	109	66	85.2	0.60	
Meeker	100	59	80.0	1.75	
Neola	102	60	80.8	0.97	
Newkirk	102	61	82.2	1.47	
Norman	98	62	80.8	2.74	
Okeene	102	52	80.5	4.17	
Pawhuska	100	60	81.4	0.93	
Perry	99	62	80.6	1.71	
Sac and Fox Agency	97	63	80.8	1.00	
Shawnee	103	62	80.7	1.31	
Snyder	101	64	82.2	0.37	
Stillwater	98	62	80.2	1.41	
Temple	107	60	83.5	3.71	
Waukomis	102	60	80.6	4.15	
Weatherford	101	59	80.4	0.49	
Whiteagle	99	62	80.2	1.10	
Oregon.					
Alba				0.48	
Albany	103	45	67.1	0.44	
Alpha	93	42	64.3	0.13	
Ashland	98	43	70.2	0.18	
Astoria	78	52	62.2	0.74	
Aurora (near)	101	47	65.8	0.71	
Bend	94	33	63.2	0.23	
Black Butte	98	43	65.8	0.17	
Blalock	107	52	78.2		
Buckhorn	99	36	67.8	0.31	
Bullrun	102	45	65.2	1.27	
Burns	97	40	67.4	0.26	
Cascade Locks	102	49	68.2	0.84	
Coquille				0.03	
Corvallis	95[e]	43[e]	65.8[e]	0.24	
Dale				1.44	
Dayville	99	40	70.0	0.54	
Doraville	98	65	63.4	0.92	
Drain	99	39	66.2	T.	
Echo	105	45	73.6	T.	
Eugene	99	46	66.0	0.18	
Fairview	84	40	61.4	T.	
Falls City	101	44	65.0	0.62	
Glendale	100	42	66.7	0.29	
Glenora	103	43	64.0	1.19	
Gold Beach	72	40	57.3	0.10	
Government Camp	86	40	56.4	0.73	
Granite	93	30	59.8	0.85	
Grants Pass	102	36	70.0	0.25	
Grass Valley	97	31	62.4	0.30	
Heppner	97[f]	36	68.4[e]	0.02	
Hood River	103	40	69.0	0.10	
Jacksonville	100	42	71.6	0.38	
Joseph	92	40	62.9	2.10	
Klamath Falls	92	36	68.2	T.	
La Grande	98	41	68.0	1.10	
McKenzie Bridge	103	39	64.4	0.50	
McMinnville	102	43	66.8	0.63	
Marshfield	73	44	60.0	0.10	
Mill City	107	39	66.9	0.54	
Monroe	102	47	66.5	0.53	
Mountain Park	95	43	66.0	0.58	
Mount Angel	103	51	69.4	1.30	
Nehalem				1.31	
Newport	79	47	60.2	0.42	
Odell				0.65	
Olex (near)	99	44	7.3	0.09	
Ontario				0.35	
Orseco	89	35	57.8	1.77	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.)			Precipitation.	
	Maximum.	Minimum.	Mean.	Rain and melted snow.	Total depth of snow.
Oregon—Cont'd.	°	°	°	*Ins.*	*Ins.*
Paisley	89	40	65.4	0.30	
Pendleton	104	41	71.8	0.12	
Port Orford	68	48	58.6	0.07	
Prineville	96	38	65.0	0.25	
Richland	100[b]	40[c]	70.0[c]	0.61	
Salem	102	50	67.6	0.67	
Silver Lake	98	35	69.1	0.51	
Stafford	106	42	66.8	0.81	
The Dalles	103	50	72.8	0.22	
Toledo	86	47	60.4	0.60	
Umatilla	105	49	77.2	0.11	
Vale	105	41	73.8	0.39	
Wallowa	98	33	63.8	0.72	
Wamic	98[c]	38[c]	64.8[c]	0.39	
Weston	97	43	69.7	0.57	
Williams	100	35	67.6	0.57	
Yonna	90	32	60.2	.....	
Pennsylvania.					
Aleppo	89	44	71.0	9.46	
Altoona	89	45	69.8	2.06	
Baldwin	86	46	69.2	4.83	
Bellefonte	94	48	74.2	1.73	
Browers Lock	.....	.....	.....	3.42	
California	91	47	73.2	4.56	
Cassandra	87	45	68.4	4.34	
Center Hall	90	54	74.1	1.54	
Clarion	.....	.....	.....	3.02	
Claysville	90	43	71.4	6.10	
Coatsville	93	53	75.2	3.42	
Confluence	.....	.....	.....	5.02	
Coraopolis	.....	.....	.....	6.29	
Davis Island Dam	.....	.....	.....	5.93	
Derry	90	44	72.0	6.13	
Doylestown	.....	.....	.....	3.60	
Drifton	89	38	66.8	2.87	
East Mauch Chunk	94	41	71.4	2.61	
Easton	91	50	74.0	1.01	
Ellwood Junction	.....	.....	.....	2.38	
Emporium	88	45	69.6	1.32	
Ephrata	90	49	73.2	4.16	
Everett	90	47	72.6	3.16	
Forks of Neshaminy	.....	.....	.....	2.52	
Franklin	89	42	69.4	4.96	
Freeport	92	44	71.9	2.87	
George School	91	52	73.2	3.43	
Gettysburg	93	49	73.8	4.79	
Girardville	.....	.....	.....	4.17	
Gordon	91	39	70.0	2.31	
Greensboro	.....	.....	.....	8.82	
Greenville	86	43	68.7	6.48	
Grove City	87	45	69.2	4.53	
Hamburg	95	47	73.5	5.19	
Hanover	92	50	75.0	6.39	
Herrs Island Dam	.....	.....	.....	5.04	
Huntingdon	93	48	70.8	4.36	
Hyndman	93	46	70.6	3.17	
Indiana	88	45	70.8	3.22	
Irwin	91	45	72.3	4.83	
Johnstown	90	43	73.0	5.39	
Kennett	87	55	72.5	2.71	
Lansdale	.....	.....	.....	1.87	
Lawrenceville	90	40	70.4	3.53	
Lebanon	93	48	74.2	3.54	
Le Roy	84	46	68.2	2.52	
Lewisburg	92	46	72.5	2.62	
Lock Haven	91	48	72.6	3.88	
Lock No. 4	.....	.....	.....	4.39	
Lycippus	86	51	71.1	5.17	
Marion	93	49	74.1	8.24	
Mauch Chunk	.....	.....	.....	2.61	
Mifflintown	91	46	72.2	1.55	
Milford	91	43	69.6	1.84	
Montrose	87	36	67.0	3.38	
New Germantown	90	47	72.0	3.77	
Ottsville	.....	.....	.....	3.85	
Parker	.....	.....	.....	4.78	
Philadelphia	92	58	76.0	4.88	
Pocono Lake	88	34	66.4	2.24	
Point Pleasant	.....	.....	.....	2.79	
Pottsville	.....	.....	.....	2.81	
Reading	90	51	74.6	4.17	
Renovo	.....	.....	.....	2.58	
Saegerstown	87	39	67.0	3.75	
Saltsburg	.....	.....	.....	6.08	
Seisholtzville	.....	.....	.....	3.69	
Selinsgrove	93	47	72.5	2.41	
Shawmont	.....	.....	.....	3.39	
Skidmore	88	44	69.6	3.03	
Smiths Corners	.....	.....	.....	2.94	
Somerset	87	40	68.5	6.24	
South Eaton	87	45	69.6	4.35	
Springdale	.....	.....	.....	5.09	
Springmount	.....	.....	.....	1.34	
State College	86	49	70.6	1.47	
Towanda	87	44	69.4	2.07	
Uniontown	89	49	72.6	6.41	
Warren	87	44	67.6	3.00	
West Chester	92	57	75.3	4.10	
West Newton	.....	.....	.....	4.54	
White Haven	89[c]	42[c]	68.6[c]	2.40	
Wilkes Barre	96	45	73.8	5.08	
Williamsport	88	49	72.0	1.88	
Rhode Island.					
Bristol	83	56	69.6	0.95	
Kingston	89	52	69.8	0.72	
Pawtucket	.....	.....	.....	1.92	
South Carolina.					
Aiken	103	63	81.8	6.87	
Allendale	100	68	83.3	5.33	
Anderson	103	64	81.2	4.41	
Batesburg	102	65	81.4	3.34	
Beaufort	101	67	82.1	5.96	
Bennettsville	102	62	81.4	3.43	
Blackville	106	66	83.8	4.80	
Blairs	.....	.....	.....	5.18	
Bowman	102	65	83.0	4.78	
Calhoun Falls	.....	.....	.....	3.73	
Camden	100	64	80.3	4.51	
Catawba	.....	.....	.....	4.42	
Chappells	.....	.....	.....	3.42	
Cheraw	97	61	80.2	2.63	
Clarks Hill	101	63	80.6	5.97	
Clemson College	96	65	80.0	2.41	
Conway	103	64	82.4	9.72	
Darlington	101	62	81.8	4.92	
Dillon	103	61	81.8	3.06	
Due West	97	64	80.7	4.22	
Edisto	.....	.....	.....	9.01	
Effingham	.....	.....	.....	4.90	
Florence	102	63	82.3	4.91	
Georgetown	98	68	82.9	8.66	
Greenville	95	60	76.4	2.27	
Greenwood	100	66	81.0	3.83	
Heath Spring	103	63	83.8	4.78	
Kingstree	97	70	83.2	6.54	
Liberty	103	63	80.4	5.96	
Little Mountain	101	66	81.1	7.53	
Newberry	104	63	82.8	3.66	
Pelzer	.....	.....	.....	3.58	
St. George	99	70	84.0	5.99	
St. Matthews	95	66	80.1	6.12	
St. Stephen	.....	.....	.....	8.47	
Saluda	103	60	81.4	2.99	
Santuck	101	63	80.6	6.27	
Smiths Mills	.....	.....	.....	4.49	
Society Hill	96	63	81.2	4.08	
Spartanburg	101	63	81.0	3.39	
Statesburg	99	66	81.5	4.35	
Summerville	101	64	82.0	5.35	
Trenton	103	62	81.6	4.33	
Trial	100	65	80.8	6.98	
Walhalla	105	56	81.0	5.40	
Walterboro	99[d]	65[d]	79.8[d]	5.91	
Winnsboro	98	65	80.8	7.63	
Yemassee	99	65	81.0	8.94	
Yorkville	102	65	82.2	3.51	
South Dakota.					
Aberdeen	95	46	69.1	2.70	
Academy	100	53	72.8	5.77	
Alexandria	.....	.....	.....	6.52	
Armour	102	52	72.8	5.30	
Ashcroft	94	48	66.8	3.32	
Bowdle	98	48	70.0	2.37	
Brookings	97	43	69.1	3.77	
Canton	97	52	70.8	5.82	
Castlewood	91	44	66.6	3.33	
Centerville	96	52	71.7	7.04	
Chamberlain	104	52	73.2	6.21	
Cherry Creek	102	49	72.6	4.97	
Clark	94	48	68.4	3.60	
Clear Lake	92	52	68.6	3.67	
De Smet	93	49	69.8	4.04	
Elk Point	98	53	73.4	5.42	
Fairfax	97	55	75.2	4.79	
Farmingdale	.....	.....	.....	3.93	
Faulkton	95	47	68.8	2.64	
Flandreau	93	50	67.9	5.66	
Forestburg	93	49	68.4	5.27	
Fort Meade	87[i]	46[d]	67.3[f]	6.23	
Frederick	93[c]	43[c]	67.9[c]	1.79	
Gannvalley	102	47	71.2	6.72	
Greenwood	99	53	73.0	5.83	
Gregory	100	51	73.4	3.62	
Hermosa	98	46	68.4	6.24	
Highmore	95	49	69.8	3.64	
Hitchcock	.....	.....	.....	3.06	
Howard	97	49	68.8	3.55	
Howell	96	46	69.3	2.39	
Ipswich	96	47	69.4	2.76	
Kenebec	.....	.....	.....	4.99	
Kidder	90	40	66.6	1.36	
Kimball	100	50	71.0	6.47	
La Delle	96	48	71.0	3.77	
Little Eagle	96[k]	47[k]	68.3[k]	3.01	
Marion	98	55	73.2	3.91	
Mellette	96	45	68.8	3.18	
Menno	95	53	71.2	5.59	
Mill Bank	94	48	68.0	1.76	
Mitchell	102	51	71.0	7.45	
Mound City	96	41	69.6	1.90	
Oelrichs	98	48	69.8	2.32	
Orman	95[c]	45[c]	68.2[c]	4.69	
Plankinton	101	50	70.9	6.41	
Ramsey	93	47	68.6	6.76	
Redfield	93	46	68.8	2.46	
Rosebud	98	47	70.4	5.46	
Roslyn	90	47	66.4	2.08	
Seine	94	40	67.6	3.31	
Sioux Falls	99	54	72.5	6.88	
Spearfish	92	44	66.6	2.88	
Stephan	97	48	69.0	4.36	
Vermillion	99	46	72.3	9.63	
Watertown	89[c]	48[c]	66.3[c]	2.57	
Wentworth	94	52	69.6	4.63	
Wessington Springs	98	52	70.5	7.05	
Woolsey	.....	.....	.....	3.45	
Tennessee.					
Arlington	99	56	80.4	4.74	
Ashwood	98[c]	55[c]	78.5[c]	1.50	
Benton	98	58	79.3	4.08	
Birds Bridge	.....	.....	.....	4.90	
Bluff City	.....	.....	.....	4.24	
Bolivar	100	58	80.6	5.39	
Bristol	.....	.....	.....	4.31	
Brownsville	99	57	81.6	4.24	
Byrdstown	96	58	77.9	6.76	
Carthage	100	58	80.6	3.54	
Cedar Hill	101	58	80.8	2.65	
Celina	.....	.....	.....	2.66	
Charleston	.....	.....	.....	4.64	
Clarksville	98	51	79.6	4.05	
Clinton	.....	.....	.....	3.73	
Covington	101	59	82.8	2.52	
Dandridge	.....	.....	.....	3.08	
Decatur	102	56	79.6	3.73	
Dickson	100	52	80.0	3.26	
Dover	103	53	81.0	3.31	
Dyersburg	100	61	82.3	2.69	
Elizabethton	93	58	76.4	3.24	
Erasmus	93	48	73.4	4.32	
Florence	98	57	78.6	4.50	
Franklin	96	56	79.0	2.89	
Halls Hill	.....	.....	.....	8.78	
Hohenwald	98	53	78.3	2.79	
Iron City	97	55	78.2	6.02	
Jackson	101	56	81.3	2.55	
Johnsonville	102	51	80.2	1.97	
Kenton	100	56	81.2	6.32	
Kingston	.....	.....	.....	4.30	
Lafayette	98	49	79.4	3.46	
Lewisburg	99	55	80.2	8.02	
Loudon	.....	.....	.....	3.10	
Lynnville	96	57	79.1	5.35	
McGee	.....	.....	.....	4.84	
McMinnville	97	54	77.2	4.62	
Maryville	100	56	80.0	3.12	
Milan	100	56	80.6	2.31	
Newport	94	59	78.0	5.52	
Palmetto	98	55	79.3	6.73	
Pinewood	100	52	78.6	2.63	
Pope	103	52	80.2	4.40	
Rogersville	95	53	76.6	6.90	
Rugby	98	50	75.8	4.24	
Savannah	100	57	80.6	4.65	
Sevierville	98	54	78.4	4.31	
Sewanee	90	60	76.2	7.69	
Silver Lake	87	50	70.8	7.01	
Sparta	96	56	78.0	5.22	
Springdale	97	60	77.6	6.51	
Springville	101	52	79.6	4.38	
Tazewell	.....	.....	.....	5.31	
Tellico Plains	98	57	78.6	4.62	
Tracy City	90	54	73.8	4.52	
Trenton	102	53	80.6	1.29	
Tullahoma	97	57	78.3	5.75	
Union City	102[c]	62[c]	83.2[c]	3.13	
Walling	.....	.....	.....	2.98	
Waynesboro	98	53	78.6	4.52	
Wildersville	94	59	78.3	2.85	
Yukon	98	60	80.2	3.08	
Texas.					
Albany	105	60	81.6	4.62	
Alvin	.....	.....	.....	2.30	
Arthur	.....	.....	.....	3.70	
Austin	93	65	78.6	2.43	
Ballinger	108	65	81.8	3.27	
Barstow	105	65	80.2	0.76	
Beaumont	.....	.....	.....	5.62	
Beeville	104	63	84.0	2.57	
Big Spring	107	65	83.5	1.81	
Blanco	100	62	80.3	2.51	
Boerne	104	56	78.8	1.50	
Bonham	100	60	81.3	3.98	
Booth	.....	.....	.....	1.16	

TABLE II.—*Climatological record of cooperative observers*—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Texas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Bowie	104	62	84.0	2.30	
Brazoria	97	66	83.0	1.38	
Brenham	100	68	82.6	2.18	
Brighton	92	70	82.4	0.28	
Brownwood	104	61	82.2	1.83	
Canadian	95	60	78.9	3.82	
Channing	102	57	78.6	1.73	
Childress	98	62	80.3	2.30	
Chillicothe				1.46	
Clarksville	100	61	83.4	4.43	
Clarendon	101	59	78.4	1.94	
Claytonville	100	60	79.8	8.29	
Coleman	97	66	79.8	3.85	
College	101	67	80.8	2.93	
Colorado	107	63	81.0	9.42	
Corsicana	102	69	85.6	1.04	
Crockett	103	64	84.4	3.07	
Cross Bar Ranch				4.50	
Cuero	102	70	86.2	2.57	
Dallas	100	65	82.6	2.67	
Dalhart	100	57	77.4	2.06	
Danevang	100	68	83.9	2.15	
Decatur	98	59	78.4	1.19	
Denison				5.52	
Dialville	100	61	83.6	0.57	
Dublin	100	66	82.0	1.20	
Duval	97	66	81.0	5.05	
Eagle Pass	106	64	87.8	2.20	
Earls Ranch				1.43	
Falfurrias	105	69	85.6	2.19	
Fort Clark	106	65	81.2	2.46	
Fort Davis	97	39	67.4	2.46	
Fort McIntosh	110	63	85.6	3.67	
Fort Stockton	107	58	81.0	1.61	
Fredericksburg	102	64	80.6	3.89	
Gainesville	100	65	82.1	3.67	
Gatesville	102	60	82.3	7.96	
Georgetown	100	62	81.9	3.54	
Gonzales				3.54	
Graham	110	60	84.7	1.83	
Grapevine	104	65	83.3	5.68	
Greenville	103	66	84.8	0.91	
Hale Center	101	58	77.2	4.18	
Hallettsville	102	69	84.6	2.14	
Haskell	101	63	82.8	4.99	
Hebbronville				1.29	
Henrietta	109	60	84.5	1.50	
Hereford	99	56	76.7	2.97	
Hillsboro	101	62	82.8	3.25	
Hondo	104	66	82.9	3.11	
Houston	101	69	84.0	3.60	
Hubbard	101	56	82.9	1.43	
Huntsville	99	62	84.2	1.11	
Jewett	98	64	81.4	0.20	
Junction				8.13	
Kaufmann	101	67	84.3	2.42	
Keene	103	66	83.2	2.07	
Kerrville	100	60	80.2	3.25	
Knickerbocker	110	61	81.0	4.49	
Kopperl				0.24	
Lampasas	103	63	82.0	2.64	
Lapara				3.71	
Laureles				0.41	
Liberty	101	64	83.2	1.45	
Llano	105	67	84.0	5.20	
Lone Star Ranch				0.55	
Longview	101	61	84.4	2.68	
Lufkin	101	56	84.0	1.12	
Luling	99	68	83.2	3.76	
McLean	96	60	76.4	3.91	
Marfa				3.10	
Memphis				2.05	
Mexia	102	65	82.8	2.34	
Miami	95	60	77.6	7.20	
Mount Blanco	96	59	77.8	5.49	
Nacogdoches	97	57	81.8	2.33	
Nazareth				5.12	
Ochiltree				1.17	
Orange				0.40	
Panter				3.01	
Paris	100	61	82.4	4.90	
Pierce				3.92	
Plemons	100	57	76.6	4.34	
Port Lavaca	95	71	82.8	5.64	
Quanah	99	68	83.0	1.20	
Rhineland	102	60	80.9	5.25	
Riverside				1.13	
Rock Island	101	69	82.8	5.50	
Rockland				3.10	
Rosnville				2.38	
Sabinal	101	66	84.8	1.93	
San Marcos	97	67	81.9	1.03	
San Saba	103	65	80.8	5.79	
Seymour	99	64	81.2	4.64	
Sherman	98	70	83.1	2.62	
Sonora	105	59	79.0	3.53	
Sugarland	98	64	82.4	0.98	
Sulphur Springs	98	69	82.4	1.45	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Texas—Cont'd.	°	°	°	*Ins.*	*Ins.*
Temple	101	63	81.6	3.73	
Texline				2.45	
Tulia				4.30	
Uvalde	109	61	83.4	1.62	
Valley Junction				0.00	
Victoria	99	69	83.9	1.69	
Waco	102	66	86.5	0.20	
Waxahachie	104	61	82.8	3.58	
Weatherford	106	60	84.4	3.18	
Wharton	101	67	83.2	3.62	
Wichita Falls	102	63	82.0	2.72	
Willis	104	66	83.2	4.32	
Wills Point	97	64	81.4	1.85	
Utah.					
Aneth	104	45	80.4	0.49	
Blackrock	100	45	73.4	0.04	
Castle Dale	96	44	71.2	0.07	
Castle Rock				0.20	
Corinne	108	46	77.0	0.50	
Emery	99	35	67.5	1.06	
Escalante	93	42	69.6	0.58	
Experiment Farm	103	48	79.8		
Farmington	96	42	72.1	0.34	
Fillmore	102	44	76.1	0.97	
Fort Duchesne	96	41	69.6	0.95	
Garrison	93	40	72.4	0.21	
Government Creek	95	43	72.6	1.11	
Grantsville				0.66	
Grayson	95	48	72.3	1.05	
Heber	94	35	65.8	0.07	
Henefer	92	33	64.9	0.48	
Hite	106	57	83.2	1.21	
Huntsville				0.11	
Ibapah	85[f]	37[f]	63.2[f]	0.79	
Kanab	95[e]	40[e]	68.0[e]	T.	
Kanosh				0.36	
Levan	92	42	70.6	0.43	
Loa	86	37	64.7	0.65	
Logan	92	45	71.0	0.00	
Lucin	98	29	61.5	1.10	
Manti	94	42	67.4	1.00	
Marion				0.37	
Marysvale	90	40	66.7	0.57	
Meadowville	86	35	62.3	T.	
Millville				0.06	
Minersville				0.28	
Moab	100	50	76.2	0.81	
Mount Nebo	99	53	76.6	0.25	
Nephi				0.98	
Oak City	98	45	75.6	1.04	
Ogden	94	47	73.6	0.23	
Park City	92	33	64.9	1.25	
Parowan	94	42	69.4	0.34	
Payson				T.	
Pinto				2.14	
Plateau	90	33	65.3	1.70	
Provo	97	45	72.6	0.30	
Ranch	86	32	61.6	0.50	
Randolph				0.04	
Richfield	102	45	72.3	1.14	
Saltair	88	53	73.1	0.23	
Scipio	93	35	69.4	0.67	
Snowville	96	34	66.6	0.19	
Soldier Summit	90	33	60.4	0.57	
Springdale	105	54	81.6	0.25	
Sunnyside				0.66	
Theodore	92	44	69.2	0.79	
Tooele	92	47	72.8	0.43	
Torrey				1.00	
Tropic	96	37	66.2	0.34	
Trout Creek	96	39	69.6	T.	
Woodruff	102	35	61.2	0.00	
Vermont.					
Bloomfield	90	41	65.6	6.26	
Cavendish	90[d]	41[d]	67.5[d]	3.37	
Chelsea	87	43	65.4	2.80	
Enosburg Falls	89	41	66.6	6.34	
Jacksonville	89	45	66.8	3.29	
Manchester	83	42	66.2	4.00	
Norwich				1.89	
St. Johnsbury	92	43	68.0	4.46	
Wells	90	45	68.3	2.83	
Woodstock	88	41	65.8	2.81	
Virginia.					
Arvonia	96	52	77.0	2.40	
Ashland	95	56	77.2	2.27	
Bigstone Gap	91	52	73.7	5.66	
Blacksburg	90	52	71.9	2.28	
Buchanan				2.64	
Burkes Garden	84	42	67.8	5.16	
Callaville	95	55	78.3	1.95	
Charlottesville	95	57	77.0	2.68	
Clarksville				5.05	
Columbia	92	56	76.1	1.78	
Dale Enterprise	96	48	72.6	3.78	
Danville				2.06	
Dinwiddie	96	49	76.4	3.70	
Doswell	98[e]	53[e]	77.1[e]	1.84	

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Virginia—Cont'd.	°	°	°	*Ins.*	*Ins.*
Elk Knob	92	57	74.7	4.58	
Fredericksburg	94	54	76.5	2.94	
Galax	90	56	71.8	3.03	
Hampton	97	61	81.2	2.78	
Hot Springs	86	47	69.4	5.06	
Ivanhoe				2.48	
Lexington	96[d]	50[d]	74.5[d]		
Lincoln	94	50	74.8	3.38	
Marion	90	50	72.2	7.01	
Mendota				5.08	
Newport News	96	62	79.3	2.93	
Nokesville (near)	90	52	74.3	3.33	
Quantico	94	48	75.4	2.48	
Radford				2.90	
Randolph				0.10	
Riverton				2.41	
Roanoke	98[e]	56[e]	78.2[e]	1.68	
Rocky Mount	96	52	75.7	3.12	
Shenandoah				4.10	
Speers Ferry				5.32	
Spottsville	95	56	77.2	9.38	
Staunton	91	44	74.2	3.81	
Stephens City	95	50	74.2	2.49	
Warsaw	95	55	76.8	1.96	
Williamsburg	95	54	77.6	7.15	
Woodstock	95	51	74.2	4.17	
Washington.					
Aberdeen	101	34	57.6	0.42	
Anacortes	89	40	60.4	0.61	
Ashford				1.60	
Bellingham	84	42	62.0	0.77	
Bogachiel	102	35	64.6	1.18	
Cedar River				1.21	
Cedonia				0.80	
Centralia	99	40	64.1	0.87	
Chapaca	101	42	71.4	0.93	
Cheney	97	38	67.5	1.73	
Clearbrook	97	36	61.4	0.95	
Clearwater	100	44	62.9	0.90	
Cle Elum	97	34	64.4	0.32	
Colville	100	37	66.6	0.11	
Conconully	96	38	66.2	1.22	
Coupeville	89	40	61.6	0.76	
Crescent	95	37	65.6	0.93	
Cusick	98	41	67.8	0.78	
Dayton	93	44	68.6	0.73	
East Sound	95	39	61.6	1.04	
Ellensburg	101	39	68.7	0.27	
Ephrata	101	47	75.2	0.00	
Fort Simcoe	99	48	72.0	0.20	
Granite Falls				1.17	
Hatton	105	36	71.5	0.65	
Huntsville				0.46	
Kennewick	107	47	75.2	0.22	
Kiona	102	45	74.4	0.09	
Kosmos	104	44	66.8	1.19	
Lacenter	99	45	65.0	1.07	
Lakeside	100	50	72.3	0.96	
Lester	103	38	63.7	0.60	
Loomis	104	52	74.4	1.38	
Lucerne	92	47	69.4	0.33	
Mottinger Ranch	106	49	77.4	0.11	
Mount Pleasant	100	41	65.8	0.95	
Moxee	103	42	71.6	0.29	
Northport	95	34	64.0	1.61	
Odessa	102	38	69.0	0.29	
Olga	82	47	59.8	0.95	
Olympia	97	44	64.8	1.22	
Pinehill	105	44	71.0	0.33	
Pomeroy	102	45	69.0	0.81	
Port Townsend	87	47	61.2	0.68	
Pullman	96	46	70.6[e]	1.11	
Quiniault	104	41	64.3	1.75	
Rattlesnake	93	46	67.4	0.37	
Ritzville				0.20	
Rock Lake				1.22	
Rosalia	92	37	65.0	3.51	
Ruby Hill	89[f]	39[f]	63.8[f]	1.03	
Sedro-Woolley	87	42	63.0	0.74	
Sixprong	102	40	74.4	0.01	
Snohomish	89	44	62.6	0.87	
Snoqualmie	99	42	66.2	1.34	
Stehekin	90	47	69.8	0.53	
Touchet	105	43	75.2	0.28	
Twisp	101	39	69.6	0.56	
Union	100[e]	41[f]	63.8[e]	1.69	
Vancouver	105	46	68.2	0.99	
Vashon	89	48	64.6	0.80	
Wahluke	104	46	75.6	0.34	
Waterville	97	33	66.3	0.62	
Wenatchee (near)	97	46	70.6	0.79	
Wilbur	92	32	63.8		
Yale	100	45	65.7	1.16	
Zindel	108	55	77.8	0.91	
West Virginia.					
Bancroft	93	54	75.8	7.36	
Bayard	87	42	68.0	7.55	
Beckley	88	48	70.8	4.75	

TABLE II.—*Climatological record of cooperative observers*—Continued. *Late reports for June, 1907.*

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
	°	°	°	*Ins.*	*Ins.*
***West Virginia*—Cont'd.**					
Bens Run	90	51	74.2	7.83	
Berkeley Springs	93	48	75.3	5.29	
Burlington	93	47	72.2	3.11	
Cairo	94	50	72.7	6.04	
Central	91	46	71.2	7.22	
Charleston	91	54	75.6	5.31	
Creston	92	51	72.3	4.78	
Cuba	89	47	72.4	5.31	
Davis				9.25	
Doane	95	50	75.8	5.42	
Elkhorn	90	51	72.6	4.49	
Fairmont	92	48	73.5	6.83	
Franklin	90	47	70.3	6.94	
Glenville	93	53	75.5	8.54	
Grafton	88	47	71.1	8.01	
Green Sulphur Springs	89	50	72.2	5.24	
Harpers Ferry				1.99	
Hinton				3.16	
Huntington	95	54	76.4	6.66	
Leonard	81	50	68.4	5.45	
Lewisburg	89	50	71.6	3.97	
Logan	95	54	75.9	7.89	
Lost City	92	50	72.0	5.51	
Lost Creek	89	46	72.2	8.68	
Madison	94	52	75.4	4.95	
Mannington	89	47	71.6	6.78	
Martinsburg	93	50	74.0	5.41	
Moorefield	95	46	72.0	5.72	
Mooresville				8.85	
Morgantown	87	47	71.2	9.36	
Moundsville	92	50	73.9	9.27	
New Cumberland	91	45	70.9	7.80	
New Martinsville	91	52	74.6	6.91	
Nuttallburg	89	48	70.6	4.40	
Oceana	92	53	75.3	7.98	
Parsons	89	45	68.2	11.82	
Philippi	90	47	71.4	7.39	
Pickens	85	43	67.7	13.36	
Point Pleasant	95	54	76.4	3.32	
Powellton	93	53	75.0	4.31	
Princeton	83	48	68.5	6.00	
Romney	98	51	75.4	2.08	
Rowlesburg				12.84	
Ryan	91	49	73.0	6.32	
Smithfield	92	45	68.4	8.09	
Southside	93	51	74.8	6.92	
Spencer	91	47	71.9	5.49	
Sutton	97	54	76.4	10.45	
Terra Alta	85	48	68.8	10.83	
Union	90	50	71.8	4.38	
Uppertract	91	45	71.8	4.87	
Valley Fork	90	52	73.7	5.70	
Wellsburg	85	51	70.5	6.37	
Weston	90	50	72.2	11.14	
Wheeling	97	45	77.6	8.53	
Williamson	94	56	77.1	4.97	
Woodbine	84	48	68.8	8.21	
Wisconsin.					
Antigo	85	40[1]	63.6[e]		
Appleton	87	45	69.8	4.03	
Appleton Marsh	85	38	67.6	9.11	
Barron	86	42	66.4		
Beloit	87	47	71.6	5.55	
Black River Falls				4.04	
Brodhead	91	47	73.1	9.37	
Burnett	86	45	69.1	5.43	
Cecil	87	41	68.0	2.71	
Chilton	85	45	69.2	5.94	
Citypoint				8.94	
Cranden	87	36	64.9	2.83	
Downing	87	39	67.0	3.30	
Eau Claire	87	47	70.0	1.12	
Florence	85	35	65.0	1.82	
Fond du Lac	86	46	69.4	5.93	
Grand Rapids	85	44	67.2	4.87	
Grand River Locks				5.54	
Grantsburg	88	43	67.0	4.35	
Hancock	85	44	69.4	7.16	
Hayward	85[d]	37[d]	65.3[d]	2.52	
Herbster	89	38	64.8	5.69	
Hillsboro	90	42	69.1	6.74	
Koepenick	85	34	64.8	2.40	
Lake Mills	91	45	71.2	7.21	
Lancaster	91	50	71.7	4.89	
Manitowoc	88	49	67.8	3.63	
Mauston	86	43	69.1	7.74	
Meadow Valley	88	38	68.7	11.27	
Medford	92	43	68.6	1.50	
Menasha				3.84	
Merrill	88	39	67.3	2.99	
Minocqua	82	44	66.8	3.09	
Mount Horeb	88	46	70.6	8.37	
Neillsville	90	40	68.6	5.45	
New London	86	46	69.2	4.57	
New Richmond	87	45	68.8	2.76	
Oconto	88	44	68.8	1.38	
Osceola	90	44	67.8	4.51	
Oshkosh	89	44	69.9	7.56	
***Wisconsin*—Cont'd.**					
Pine River	79	44	68.2	8.71	
Portage	88	49	70.6	6.85	
Port Washington	86	47	67.3	9.24	
Prairie du Chien	95	52		4.99	
Prentice	82	31	62.4	2.08	
Racine	92	46	71.0	4.79	
Sheboygan	89	50	69.2	5.66	
Shullsburg	96	48	71.8	6.78	
Solon Springs	87	37	66.0	5.39	
Spooner	86	39	66.5	4.23	
Stanley	83	36	66.2	3.93	
Stevens Point	89	38	68.3	3.12	
Sturgeon Bay	92	43	65.2	3.22	
Valley Junction	86	39	68.4	9.28	
Viroqua	88	45	70.2	8.99	
Watertown	87	43	69.0	6.47	
Waukesha	91	42	71.4	6.35	
Waupaca	89	44	69.6	6.09	
Wausau	82	42	66.6	2.91	
Weyerhauser	83	33	64.8	4.10	
Whitehall				4.20	
Wyoming.					
Barnum				0.85	
Barrett	80[m]	28[m]	55.3[m]		
Basin	102	43	72.8	0.58	
Bedford	85	29	57.7	0.37	
Blue Cap	90	28	55.6	1.37	
Border	89	30	61.7	T.	
Buffalo	95	40	65.5	1.64	
Camp Colter	93	40	67.0	0.98	
Chugwater	93	38	66.0	1.11	
Clark	94	45	67.9	1.09	
Clear Creek Cabin	85	29	55.5	2.66	
Daniel	81	30	55.9	0.82	
Dubois	88	24	56.4	1.00	
Elk Mountain				1.05	
Etons Ranch				1.00	
Evanston	84	32	61.0	0.07	
Experiment Farm				3.37	
Fontenelle	90	30	61.2		
Fort Laramie	100	44	71.0	2.37	
Granite Canyon	86	38	61.0	3.18	
Granite Springs	90	41	65.5	2.61	
Green River	92	40	66.9	0.09	
Griggs	94	38	65.2	1.08	
Hatton				1.54	
Hyattville	91	39	65.9	0.13	
Jackson	84	31	57.8	1.33	
Kirtley	90	41	65.0	0.65	
Laramie	85	41	62.6	3.68	
Leo	89	32	62.6	0.15	
Lolabama Ranch	78	34	55.9	1.49	
Lusk	92	40	65.2	0.12	
Moorcroft	102	40	68.6	2.20	
Moore	90[d]	35[d]	64.4[d]	0.45	
Newcastle	95	44	69.8	2.17	
Pathfinder	95	43	69.8	0.22	
Phillips	92	43	67.8	1.68	
Pine Bluff	99	43	69.6	4.61	
Pinedale	87	30	59.1	0.59	
Rawlins	89	37	65.9	0.11	
Riverton	95	39	69.7	0.42	
Saratoga	86	34	62.8	0.68	
Shoshone Dam	90	44	66.4	1.54	
South Pass City	85	23	53.6	T.	
Ten Sleep	112	40	75.0	0.75	
Wells	76	26	52.6	1.14	
Wheatland	97	43	72.4	2.30	
Worland	100	43	72.2	0.40	
Wyncote	97	45	70.2	1.91	
Yellowstone Pk. (Fount.)	77	30	54.5	1.86	
Yellowstone Pk. (G. Can.)	82	30	53.0	2.33	
Yellowstone Pk. (Norris)	80	38	57.2	2.28	
Yellowstone Pk. (Riv'side)	88	29	56.6	5.46	
Yellowstone Pk. (S. River)	92[e]	30	57.6[d]	1.70	
Yellowstone Pk. (Soda B.)	78	29	53.1	2.43	
Yellowstone Pk. (T. Sta.)	79	30	54.0	0.90	
Yellowstone Pk. (Up. Ba.)	90	29	56.0	1.29	
Porto Rico.					
Adjuntas	86	60	72.4	3.38	
Aguirre	98	72	82.2	1.47	
Albonito	87	62	75.8	2.15	
Alto de La Bandera	86	66	75.1	6.55	
Anasco	94	66	79.8	11.40	
Arecibo	91	61	76.2	5.52	
Barros	91	62	77.8	3.57	
Bayamon	90	66	77.8	5.25	
Caguas	96	62	78.8	4.25	
Canovanas	90	73	81.4	6.07	
Cayey	87	60	75.0	1.88	
Cidra	89	61	76.5	4.61	
Corozal	92[l]	65[l]	79.8[l]		
Culebra	92	73	80.8	2.67	
Fajardo	90	71	82.1	5.07	
Guayama				2.51	
Hacienda Colosa	92	65	78.8	12.35	
Humacao	90	69	79.9	4.14	
Isabela	91	69	80.2	2.63	
***Porto Rico*—Cont'd.**					
Isolina	97	63	76.7	6.15	
La Carmelita	90	63	75.7	6.96	
Lares	94	60	77.2	6.42	
Las Marias	90	59	75.8	10.80	
Manati	97	66	80.3	3.27	
Maricao	87	62[e]	73.2[b]	12.80	
Maunabo	91	72	82.4	5.60	
Mayaguez	92	64	78.4	11.88	
Morovis	93	61	77.0	4.55	
Ponce	95	67	81.4	2.20	
Rio Blanco	89	66	79.1	7.34	
Rio Piedras				4.11	
San German	94[e]	64[d]	79.8[d]	5.16	
San Lorenzo	90	62	76.8	2.43	
San Salvador	90	63	74.0	7.19	
Santa Isabel	95[d]	69[d]	80.8[d]	1.49	
Vieques	90	69	81.3	6.42	
Yabucoa				5.17	
Yauco	93	61	79.3	2.55	
New Brunswick.					
St. John	75	49	58.9	2.98	

Late reports for June, 1907.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation. Rain and melted snow.	Total depth of snow.
Alaska.					
Central				2.21	
Chestochena	88	29	54.6	1.50	
Coal Harbor	70	34	47.3	1.88	
Copper Center	84	42	59.8		
Fort Liscum	65	35	48.8	2.83	
Holy Cross Mission	74	36	52.9	2.95	
Kenai	64	28	47.5	2.31	
Ketchemstock	80	27	51.2	2.03	
Loring	82	36	53.9	5.23	
Sunrise	75	34	49.6	0.74	
Teikhell	84	30	53.5	0.68	
Tyonok				2.86	
Valdez	84	30	53.3	0.68	
Wood Island	71	35	49.2	5.20	
California.					
Marysville				0.77	
Mills College				1.43	
Mojave	102	50	75.2	0.00	
Salton	95	68	81.2	0.00	
Colorado.					
Cascade				1.78	
Colfax				2.90	
Florida.					
Arcadia				8.17	
Plant City	98	60	78.2	12.91	
Idaho.					
Pollock	94	39	60.0	1.91	
Roosevelt				3.90	
Iowa.					
Nevada				4.67	
Louisiana.					
Ruston	95	54	77.0	4.15	
Michigan.					
Plymouth	93	38	63.2	4.60	
Montana.					
Agricultural College	77	33	52.2	3.79	
Copper				4.12	
Hamilton	82	35	55.6	4.35	
Nebraska.					
Albion	94[e]	37[e]	66.6[e]	2.21	
New York.					
Baldwinsville	91	38	64.4	3.25	
Chazy	96	35	64.4	2.90	
Perry City	93	34	60.8	5.72	
North Dakota.					
Wahpeton	86	34	62.7	2.48	
Oregon.					
Sparta	85	31	55.4	1.40	
South Carolina.					
Statesburg	93	56	75.6	6.30	
South Dakota.					
Gregory	91	40[b]	66.0[d]	2.10	
Tennessee.					
Franklin	89	49	72.1	3.75	
Texas.					
Ochiltree				5.78	
Washington.					
Chapaca	91	40	64.9	1.50	
West Virginia.					
Southside	92	44	68.2	3.44	

CORRECTIONS.

June, 1907.

Colorado, Colorado Springs report should read, maximum 87, minimum 37, mean 60.5, precipitation 0.36.

TABLE III.—*Wind resultants, from observations at 8 a. m. and 8 p. m., daily, during the month of July, 1907.*

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
	Hours.	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
New England.						
Eastport, Me	6	35	9	22	s. 24 w.	32
Portland, Me	12	25	11	26	s. 49 w.	20
Concord, N. H. †	9	8	7	14	n. 89 w.	7
Burlington, Vt. †	2	21	3	6	s. 9 w.	19
Northfield, Vt	20	34	6	11	s. 20 w.	15
Boston, Mass	10	19	11	36	s. 70 w.	27
Nantucket, Mass	9	30	6	34	s. 53 w.	35
Block Island, R. I	8	31	6	31	s. 47 w.	34
Providence, R. I	10	23	9	30	s. 59 w.	25
Hartford, Conn	14	30	2	24	s. 54 w.	27
New Haven, Conn	22	23	9	23	s. 86 w.	14
Middle Atlantic States.						
Albany, N. Y	13	32	3	23	s. 46 w.	28
Binghamton, N. Y. †	11	2	10	14	n. 24 w.	10
New York, N. Y	17	26	7	27	s. 66 w.	22
Harrisburg, Pa	18	19	9	32	s. 88 w.	23
Philadelphia, Pa	30	20	7	30	w.	23
Scranton, Pa	18	25	9	29	s. 71 w.	21
Atlantic City, N. J	13	27	4	33	s. 64 w.	32
Cape May, N. J	8	32	10	20	s. 23 w.	26
Baltimore, Md	17	19	5	28	s. 85 w.	23
Washington, D. C	20	19	11	28	n. 87 w.	17
Lynchburg, Va	21	20	9	28	n. 87 w.	19
Mount Weather, Va	20	15	8	36	n. 80 w.	28
Norfolk, Va	11	33	12	19	s. 18 w.	23
Richmond, Va	16	28	17	11	s. 27 e.	13
Wytheville, Va	10	14	8	40	s. 83 w.	32
South Atlantic States.						
Asheville, N. C	35	12	13	17	n. 10 w.	23
Charlotte, N. C	11	27	18	18	s.	16
Hatteras, N. C	10	25	9	35	s. 60 w.	30
Raleigh, N. C	12	24	8	29	s. 60 w.	24
Wilmington, N. C	8	25	6	34	s. 59 w.	33
Charleston, S. C	5	30	4	35	s. 51 w.	40
Columbia, S. C	14	27	10	25	s. 49 w.	20
Augusta, Ga	12	28	14	23	s. 29 w.	18
Savannah, Ga	8	25	2	38	s. 65 w.	40
Jacksonville, Fla	6	39	9	27	s. 29 w.	38
Florida Peninsula.						
Jupiter, Fla	7	32	13	27	s. 29 w.	29
Key West, Fla	13	23	30	10	s. 63 e.	22
Tampa, Fla	10	21	20	27	s. 32 w.	13
Eastern Gulf States.						
Atlanta, Ga	21	20	10	27	n. 87 w.	17
Macon, Ga. †	6	9	3	19	s. 79 w.	16
Thomasville, Ga	3	32	15	22	s. 16 w.	25
Pensacola, Fla. †	13	6	6	14	n. 49 w.	11
Anniston, Ala	23	23	14	18	w.	4
Birmingham, Ala	18	18	9	31	w.	22
Mobile, Ala	20	26	8	20	s. 63 w.	13
Montgomery, Ala	9	27	6	29	s. 52 w.	29
Meridian, Miss	13	26	12	30	s. 54 w.	22
Vicksburg, Miss	15	23	11	27	s. 63 w.	18
New Orleans, La	15	25	10	29	s. 62 w.	22
Western Gulf States.						
Shreveport, La	8	33	18	17	s. 2 e.	25
Bentonville, Ark. †	3	23	8	1	s. 19 e.	21
Fort Smith, Ark	6	26	32	4	s. 54 e.	34
Little Rock, Ark	13	35	9	19	s. 24 w.	24
Corpus Christi, Tex	2	47	26	1	s. 29 e.	52
Fort Worth, Tex	8	40	21	8	s. 22 e.	34
Galveston, Tex	5	42	15	10	s. 8 e.	37
Palestine, Tex	6	37	14	16	s. 4 w.	31
San Antonio, Tex	3	37	35	0	s. 46 e.	49
Taylor, Tex. †	2	24	2	6	s. 10 w.	22
Ohio Valley and Tennessee.						
Chattanooga, Tenn	10	21	5	40	s. 73 w.	37
Knoxville, Tenn	16	20	18	24	s. 56 w.	7
Memphis, Tenn	14	31	11	24	s. 38 w.	22
Nashville, Tenn	15	19	7	35	s. 82 w.	28
Lexington, Ky. †	4	10	6	16	s. 59 w.	12
Louisville, Ky	14	26	10	25	s. 51 w.	19
Evansville, Ind. †	7	15	8	10	s. 14 w.	8
Indianapolis, Ind	19	28	15	15	s.	9
Cincinnati, Ohio	19	16	17	26	n. 72 w.	10
Columbus, Ohio	17	20	13	25	s. 76 w.	12
Pittsburg, Pa	19	22	4	30	s. 83 w.	26
Parkersburg, W. Va	17	27	12	17	s. 27 w.	11
Elkins, W. Va	16	20	12	23	s. 70 w.	12
Lower Lake Region.						
Buffalo, N. Y	9	25	4	39	s. 65 w.	38
Canton, N. Y. †	2	15	3	20	s. 52 w.	22
Oswego, N. Y	10	24	5	32	s. 63 w.	30
Rochester, N. Y	11	20	5	40	s. 76 w.	36
Syracuse, N. Y	10	24	7	29	s. 58 w.	26
Erie, Pa	16	19	8	30	s. 82 w.	22
Cleveland, Ohio	17	21	17	23	s. 56 w.	7
Sandusky, Ohio †	7	11	4	15	s. 70 w.	12
Toledo, Ohio	13	22	8	36	s. 72 w.	29
Detroit, Mich	12	20	8	31	s. 71 w.	24
Upper Lake Region.						
Alpena, Mich	25	18	6	24	n. 69 w.	19
Escanaba, Mich	25	23	6	19	n. 81 w.	13
Grand Haven, Mich	15	23	10	25	s. 62 w.	17
Grand Rapids, Mich	20	15	8	31	n. 78 w.	24
Houghton, Mich. †	8	2	9	18	n. 56 w.	11
Marquette, Mich	21	13	12	29	n. 65 w.	19
Port Huron, Mich	18	23	10	25	s. 72 w.	16
Sault Ste. Marie, Mich	18	11	10	36	n. 75 w.	27
Chicago, Ill	15	15	14	29	w.	15
Milwaukee, Wis	18	14	18	24	n. 56 w.	7
Green Bay, Wis	13	23	12	27	s. 56 w.	18
Duluth, Minn	22	14	7	34	n. 73 w.	28

Stations.	Component direction from—				Resultant.	
	N.	S.	E.	W.	Direction from—	Duration.
	Hours.	*Hours.*	*Hours.*	*Hours.*	°	*Hours.*
North Dakota.						
Moorhead, Minn	22	19	10	25	n. 79 w.	15
Bismarck, N. Dak	27	16	10	21	n. 45 w.	16
Devils Lake, N. Dak	16	18	6	35	s. 86 w.	29
Williston, N. Dak	25	15	12	26	n. 54 w.	17
Upper Mississippi Valley.						
Minneapolis, Minn. *	10	7	4	16	n. 76 w.	12
St. Paul, Minn	30	17	12	15	n. 13 w.	13
La Crosse, Wis. †	10	17	3	8	s. 36 w.	9
Madison, Wis	21	19	10	28	n. 84 w.	18
Charles City, Iowa	22	23	7	27	s. 87 w.	20
Davenport, Iowa	19	18	12	29	n. 87 w.	17
Des Moines, Iowa	19	26	11	22	s. 58 w.	13
Dubuque, Iowa	23	22	6	30	n. 88 w.	24
Keokuk, Iowa	16	30	11	19	s. 30 w.	16
Cairo, Ill	17	29	8	25	s. 55 w.	21
La Salle, Ill. †	9	9	11	10	e.	1
Peoria, Ill	15	21	17	23	s. 45 w.	8
Springfield, Ill	19	21	8	30	s. 85 w.	22
Hannibal, Mo. †	10	11	5	16	s. 85 w.	11
St. Louis, Mo	14	20	11	30	s. 72 w.	20
Missouri Valley.						
Columbia, Mo. *	8	16	6	9	s. 21 w.	8
Kansas City, Mo	17	36	9	9	s.	19
Springfield, Mo	11	33	14	17	s. 8 w.	22
Iola, Kans. †	6	16	8	11	s. 17 w.	10
Topeka, Kans. *	5	19	7	1	s. 23 e.	15
Lincoln, Nebr	19	29	19	5	s. 54 e.	17
Omaha, Nebr	20	21	18	15	s. 72 e.	3
Valentine, Nebr	26	17	19	12	n. 38 e.	11
Sioux City, Iowa †	11	13	9	7	s. 45 e.	3
Pierre, S. Dak	19	19	29	15	e.	14
Huron, S. Dak	28	19	18	11	n. 38 e.	11
Yankton, S. Dak. †	11	7	7	11	n. 45 w.	6
Northern Slope.						
Havre, Mont	17	13	15	31	n. 77 w.	16
Miles City, Mont	24	16	24	15	n. 48 e.	12
Helena, Mont	15	24	9	35	s. 71 w.	28
Kalispell, Mont	10	13	11	36	s. 83 w.	25
Rapid City, S. Dak						
Cheyenne, Wyo	22	20	12	19	n. 74 w.	7
Lander, Wyo	20	10	10	34	n. 67 w.	26
Sheridan, Wyo	19	25	17	20	s. 27 w.	7
Yellowstone Park, Wyo	9	36	2	32	s. 48 w.	40
North Platte, Nebr	21	24	30	6	s. 83 e.	24
Middle Slope.						
Denver, Colo	19	25	10	19	s. 56 w.	11
Pueblo, Colo	23	18	15	23	n. 58 w.	9
Concordia, Kans	13	35	19	8	s. 26 e.	25
Dodge, Kans	15	30	32	6	s. 60 e.	30
Wichita, Kans	8	43	22	2	s. 30 e.	40
Oklahoma, Okla	10	44	12	0	s. 19 e.	36
Southern Slope.						
Abilene, Tex	11	41	15	5	s. 18 e.	32
Amarillo, Tex	9	37	21	4	s. 31 e.	33
Del Rio, Tex †	2	8	27	0	s. 78 e.	28
Roswell, N. Mex.	12	30	19	14	s. 32 e.	9
Southern Plateau.						
El Paso, Tex	21	10	33	16	n. 57 e.	20
Santa Fe, N. Mex	19	18	31	10	n. 87 e.	21
Flagstaff, Ariz	23	18	1	33	n. 81 w.	32
Phoenix, Ariz	13	10	21	29	n. 69 w.	8
Yuma, Ariz	3	34	15	24	s. 16 w.	32
Independence, Cal	19	18	17	26	n. 84 w.	9
Middle Plateau.						
Reno, Nev	3	14	3	52	s. 77 w.	50
Tonopah, Nev	5	26	18	30	s. 30 w.	24
Winnemucca, Nev	14	20	10	36	s. 77 w.	27
Modena, Utah	4	22	1	48	s. 69 w.	50
Salt Lake City, Utah	20	19	24	13	n. 84 e.	9
Durango, Colo	36	6	10	30	n. 34 w.	36
Grand Junction, Colo	16	17	25	20	s. 79 e.	5
Northern Plateau.						
Baker City, Oreg	21	25	8	22	s. 74 w.	15
Boise, Idaho	24	15	11	23	n. 53 w.	15
Lewiston, Idaho †	0	4	28	1	s. 82 e.	27
Pocatello, Idaho	7	24	29	25	s. 16 w.	18
Spokane, Wash	17	18	20	19	s. 45 e.	1
Walla Walla, Wash						
North Pacific Coast Region.						
North Head, Wash	34	10	4	34	n. 51 w.	38
Port Crescent, Wash. *	9	4	1	23	n. 77 w.	23
Seattle, Wash	22	16	14	24	n. 59 w.	12
Tacoma, Wash	33	9	2	26	n. 45 w.	34
Tatoosh Island, Wash	3	39	8	28	s. 29 w.	41
Portland, Oreg	40	8	8	23	n. 25 w.	35
Roseburg, Oreg	34	7	10	18	n. 17 w.	28
Middle Pacific Coast Region.						
Eureka, Cal	26	14	3	34	n. 69 w.	33
Mount Tamalpais, Cal	22	6	2	48	n. 71 w.	49
Red Bluff, Cal	8	35	26	11	s. 29 e.	31
Sacramento, Cal	1	55	11	5	s. 6 e.	54
San Francisco, Cal	0	17	0	54	s. 72 w.	57
San Jose, Cal. †	22	0	0	22	n. 45 w.	31
Southeast Farallon, Cal. *	14	4	0	22	n. 66 w.	24
South Pacific Coast Region.						
Fresno, Cal	31	5	1	45	n. 60 w.	51
Los Angeles, Cal	10	16	14	34	s. 73 w.	21
San Diego, Cal	25	12	1	37	n. 70 w.	38
San Luis Obispo, Cal	31	6	1	35	n. 53 w.	42
West Indies						
San Juan, Porto Rico						
Grand Turk, W. I. †						

* From observations at 8 p. m. only. † From observations at 8 a. m. only.

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, for storms in which the rate of fall equaled or exceeded 0.25 in any 5 minutes, or 0.80 in 1 hour, during July, 1907, at all stations furnished with self-registering gages.*

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
Abilene, Tex	11	12:25 a. m.	10:15 a. m.	1.41	12:28 a. m.	12:51 a. m.	0.01	0.24	0.67	0.89	0.96	1.01	.....	.....	.....	.....	.....	.....	.....	.....	.....
Albany, N. Y	17	1:24 p. m.	5:50 p. m.	1.62	1:43 p. m.	2:28 p. m.	0.01	0.10	0.31	0.70	0.74	0.94	1.22	1.28	1.34	1.49	.....	.....	.....	.....	.....
Alpena, Mich	8	.....	.....	0.24	.....	.....	.....	.....	0.21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Amarillo, Tex	1–2	9:50 p. m.	3:00 a. m.	0.73	9:58 p. m.	10:15 p. m.	0.02	0.38	0.57	0.64	0.68	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Anniston, Ala	26	9:11 p. m.	11:20 p. m.	1.80	10:01 p. m.	10:47 p. m.	0.27	0.06	0.13	0.32	0.47	0.63	0.83	1.03	1.35	1.80	.....	.....	.....	.....	.....
Do	29	6:29 p. m.	8:35 p. m.	0.78	6:35 p. m.	6:50 p. m.	0.02	0.23	0.59	0.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Asheville, N. C	11–12	.....	.....	2.52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.41	.....	.....	.....
Atlanta, Ga	9–10	10:50 p. m.	1:15 a. m.	1.02	12:05 a. m.	12:40 a. m.	0.15	0.17	0.24	0.35	0.51	0.63	0.75	0.84	.....	.....	.....	.....	.....	.....	.....
Atlantic City, N. J	20	2:35 p. m.	3:50 p. m.	0.53	3:12 p. m.	3:44 p. m.	0.01	0.08	0.26	0.28	0.32	0.41	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Augusta, Ga	25	7:35 p. m.	8:25 p. m.	1.01	7:38 p. m.	8:00 p. m.	0.01	*	*	*	*	0.99	1.00	.....	.....	.....	.....	.....	.....	.....	.....
Baltimore, Md	18	6:50 p. m.	D. N.	3.04	6:55 p. m.	7:40 p. m.	0.01	0.30	0.60	1.05	1.59	2.03	2.20	2.38	2.61	2.72	.....	.....	.....	.....	.....
Bentonville, Ark	28	.....	.....	0.26	.....	.....	.....	.....	0.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Binghamton, N. Y	20	4:50 p. m.	7:20 p. m.	0.78	5:03 p. m.	5:23 p. m.	0.04	0.19	0.42	0.51	0.56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Birmingham, Ala	9	2:29 p. m.	3:12 p. m.	0.78	2:33 p. m.	2:53 p. m.	0.01	0.35	0.53	0.64	0.70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	20	5:09 p. m.	7:25 p. m.	1.29	5:13 p. m.	6:01 p. m.	0.02	0.09	0.41	0.55	0.64	0.69	0.86	0.94	1.06	1.17	1.23	.....	.....	.....	.....
Bismarck, N. Dak	17	.....	.....	0.38	.....	.....	.....	.....	.....	.....	.....	.....	0.32	.....	.....	.....	.....	.....	.....	.....	.....
Block Island, R. I	26	5:50 a. m.	9:35 a. m.	0.99	8:22 a. m.	8:50 a. m.	0.44	0.08	0.11	0.37	0.42	0.47	0.53	.....	.....	.....	.....	.....	.....	.....	.....
Boise, Idaho	3	.....	.....	0.12	.....	.....	.....	.....	0.07	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston, Mass	11	.....	.....	0.47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.21	.....	.....	.....
Buffalo, N. Y	25–26	10:35 p. m.	4:15 a. m.	0.78	3:50 a. m.	4:05 a. m.	0.26	0.06	0.32	0.51	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cairo, Ill	28–29	.....	.....	2.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.49	.....	.....	.....
Canton, N. Y	20	.....	.....	0.39	.....	.....	.....	.....	.....	.....	.....	.....	0.30	.....	.....	.....	.....	.....	.....	.....	.....
Charles City, Iowa	7	8:55 p. m.	10:05 p. m.	1.10	9:06 p. m.	9:22 p. m.	0.02	0.20	0.62	0.98	1.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	10	10:00 a. m.	2:05 p. m.	1.53	11:58 a. m.	12:39 p. m.	0.15	0.17	0.48	0.52	0.55	0.68	0.71	0.75	0.88	0.92	.....	.....	.....	.....	.....
Charleston, S. C	12	.....	.....	0.26	.....	.....	.....	.....	.....	.....	.....	.....	0.25	.....	.....	.....	.....	.....	.....	.....	.....
Charlotte, N. C	13	9:19 p. m	D. N.	1.13	9:20 p. m.	9:50 p. m.	T.	0.39	0.61	0.66	0.70	0.77	0.86	.....	.....	.....	.....	.....	.....	.....	.....
Chattanooga, Tenn	12	.....	.....	0.45	.....	.....	.....	.....	.....	0.42	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cheyenne, Wyo	25–26	5:12 p. m.	6:12 a. m.	0.94	6:26 p. m.	6:47 p. m.	0.10	0.06	0.24	0.33	0.44	0.45	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	31	4:20 p. m.	4:56 p. m.	0.48	4:32 p. m.	4:40 p. m.	T.	0.26	0.44	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago, Ill	11	6:50 a. m.	9:21 a. m.	0.61	7:09 a. m.	7:34 a. m.	0.06	0.05	0.13	0.31	0.42	0.55	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cincinnati, Ohio	7	6:23 p. m.	8:15 p. m.	0.83	6:30 p. m.	6:54 p. m.	0.03	0.07	0.28	0.51	0.59	0.72	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	10	1:35 p. m.	3:42 p. m.	0.80	1:40 p. m.	2:12 p. m.	0.01	0.18	0.33	0.46	0.54	0.61	0.68	0.72	.....	.....	.....	.....	.....	.....	.....
Cleveland, Ohio	1	12:10 p. m.	2:56 p. m.	1.11	12:32 p. m.	1:08 p. m.	0.01	0.09	0.10	0.20	0.44	0.48	0.62	0.95	0.98	.....	.....	.....	.....	.....	.....
Columbia, Mo	14	6:17 a. m.	11:27 a. m.	1.23	9:03 a. m.	9:33 a. m.	0.25	0.20	0.23	0.37	0.41	0.45	0.58	.....	.....	.....	.....	.....	.....	.....	.....
Do	15	D. N.	5:30 a. m.	1.24	2:35 a. m.	3:00 a. m.	0.06	0.22	0.41	0.55	0.60	0.65	.....	.....	.....	.....	.....	.....	.....	.....	.....
Columbia, S. C	25	7:58 p. m.	9:15 p. m.	0.81	8:09 p. m.	8:54 p. m.	0.01	0.17	0.33	0.45	0.50	0.54	0.64	0.68	0.73	0.78	.....	.....	.....	.....	.....
Columbus, Ohio	9	D. N.	7:09 a. m.	0.97	5:29 a. m.	6:13 a. m.	0.13	0.11	0.18	0.18	0.22	0.32	0.37	0.54	0.70	0.78	.....	.....	.....	.....	.....
Concord, N. H	7	4:15 p. m.	5:35 p. m.	2.73	4:17 p. m.	4:58 p. m.	0.01	0.09	0.30	0.60	1.09	1.60	2.15	2.48	2.69	.....	.....	.....	.....	.....	.....
Corpus Christi, Tex	8	.....	.....	0.26	.....	.....	.....	.....	0.14	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Davenport, Iowa	10	4:40 p. m.	6:10 p. m.	1.27	5:05 p. m.	5:30 p. m.	0.01	0.10	0.44	0.84	1.09	1.23	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	10	7:20 p. m.	D. N.	0.96	8:20 p. m.	8:50 p. m.	0.10	0.08	0.28	0.53	0.66	0.77	0.83	.....	.....	.....	.....	.....	.....	.....	.....
Do	25	12:50 a. m.	9:15 a. m.	0.97	6:30 a. m.	7:05 a. m.	0.10	0.19	0.30	0.39	0.55	0.60	0.72	0.79	.....	.....	.....	.....	.....	.....	.....
Del Rio, Tex	2	7:15 p. m.	7:55 p. m.	0.42	7:22 p. m.	7:33 p. m.	0.02	0.12	0.36	0.39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Denver, Colo	25–26	.....	.....	0.97	.....	.....	.....	.....	.....	.....	.....	.....	0.21	.....	.....	.....	.....	.....	.....	.....	.....
Des Moines, Iowa	14–15	7:45 p. m.	1:15 a. m.	3.83	10:47 p. m.	12:22 a. m.	0.40	0.11	0.28	0.50	0.85	1.18	1.41	1.62	1.80	1.90	2.01	2.14	2.95	3.29	.....
Do	16	4:40 a. m.	8:00 a. m.	1.74	6:56 a. m.	7:42 a. m.	0.34	0.23	0.29	0.30	0.43	0.61	0.65	0.67	0.90	1.38	1.39	.....	.....	.....	.....
Do	20	6:58 a. m.	10:20 a. m.	1.88	7:54 a. m.	8:24 a. m.	0.17	0.05	0.15	0.37	0.59	0.72	0.95	.....	.....	.....	.....	.....	.....	.....	.....
					9:00 a. m.	9:15 a. m.	1.16	0.42	0.56	0.61	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit, Mich	11	.....	.....	1.19	.....	.....	.....	.....	0.22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dodge, Kans	12	.....	.....	0.54	.....	.....	.....	.....	.....	.....	.....	.....	0.38	.....	.....	.....	.....	.....	.....	.....	.....
Dubuque, Iowa	10	2:28 p. m.	5:10 p. m.	0.90	2:38 p. m.	3:04 p. m.	0.03	0.09	0.18	0.28	0.47	0.55	0.57	.....	.....	.....	.....	.....	.....	.....	.....
Do	21	7:15 p. m.	9:22 p. m.	1.05	7:24 p. m.	8:29 p. m.	0.02	0.06	0.13	0.23	0.30	0.32	0.40	0.42	0.43	0.52	0.55	0.64	0.92	.....	.....
Duluth, Minn	23	7:02 p. m.	8:15 p. m.	0.80	7:23 p. m.	7:47 p. m.	0.03	0.17	0.48	0.62	0.69	0.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eastport, Me	26	1:55 p. m.	4:10 p. m.	0.89	1:55 p. m.	2:45 p. m.	0.00	0.12	0.14	0.18	0.31	0.33	0.34	0.45	0.65	0.76	0.84	.....	.....	.....	.....
Elkins, W. Va	17	2:45 a. m.	9:20 p. m.	4.24	5:25 a. m.	6:25 a. m.	0.53	0.10	0.35	0.54	0.72	0.90	1.14	1.33	1.45	1.66	1.82	2.06	.....	.....	.....
					7:39 a. m.	8:33 a. m.	2.76	0.17	0.20	0.26	0.44	0.52	0.56	0.63	0.66	0.73	0.84	0.90	.....	.....	.....
Erie, Pa	25	.....	.....	0.79	.....	.....	.....	.....	.....	.....	.....	.....	0.49	.....	.....	.....	.....	.....	.....	.....	.....
Escanaba, Mich	7–8	11:50 p. m.	D. N.	0.60	12:03 a. m.	12:20 a. m.	0.01	0.17	0.23	0.39	0.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Evansville, Ind	17	10:15 p. m.	11:30 p. m.	0.94	10:43 p. m.	11:05 p. m.	0.02	0.16	0.50	0.75	0.87	0.91	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	20	3:30 p. m.	4:28 p. m.	0.92	3:48 p. m.	4:08 p. m.	0.01	0.11	0.39	0.69	0.82	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fort Smith, Ark	11	3:28 a. m.	10:20 a. m.	2.76	7:36 a. m.	8:49 a. m.	1.27	0.05	0.20	0.33	0.47	0.59	0.75	0.98	1.08	1.13	1.19	1.29	.....	.....	.....
Fort Worth, Tex	9–10	10:40 p. m.	10:35 a. m.	2.16	2:48 a. m.	3:05 a. m.	0.29	0.11	0.31	0.40	0.43	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Galveston, Tex	20	8:05 a. m.	9:30 a. m.	0.77	8:46 a. m.	9:07 a. m.	0.01	0.15	0.44	0.59	0.67	0.71	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Haven, Mich	21	2:40 p. m.	5:30 p. m.	2.74	2:43 p. m.	3:29 p. m.	0.01	0.17	0.21	0.22	0.28	0.38	0.63	0.71	1.06	1.25	1.52	1.58	.....	.....	.....
					4:27 p. m.	4:42 p. m.	1.83	0.21	0.53	0.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Rapids, Mich	24	5:26 a. m.	6:15 a. m.	0.67	5:36 a. m.	5:54 a. m.	0.04	0.18	0.47	0.52	0.63	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green Bay, Wis	7	.....	.....	0.44	.....	.....	.....	.....	0.36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hannibal, Mo	25	6:30 p. m.	D. N.	1.52	7:48 p. m.	9:18 a. m.	0.11	0.08	0.10	0.24	0.39	0.45	0.46	0.50	0.56	0.61	0.70	0.76	0.97	1.53	.....
Harrisburg, Pa	7–8	.....	.....	0.64	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.55	.....	.....
Hartford, Conn	20	.....	.....	0.37	.....	.....	.....	.....	.....	.....	.....	.....	0.29	.....	.....	.....	.....	.....	.....	.....	.....
Hatteras, N. C	29–30	7:45 p. m.	12:45 a. m.	1.39	8:55 p. m.	9:26 p. m.	0.43	0.09	0.17	0.29	0.44	0.54	0.66	0.68	.....	.....	.....	.....	.....	.....	.....
Huron, S. Dak	13	4:38 p. m.	5:25 p. m.	0.61	4:50 p. m.	5:05 p. m.	0.02	0.10	0.30	0.57	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	20	4:45 p. m.	6:10 p. m.	1.16	5:20 p. m.	5:45 p. m.	T.	0.06	0.31	0.67	0.96	1.10	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind	7	4:24 p. m.	5:10 p. m.	0.58	4:24 p. m.	4:45 p. m.	0.00	0.19	0.31	0.39	0.54	0.55	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iola, Kans	9	.....	.....	0.61	.....	.....	.....	.....	.....	.....	0.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jacksonville, Fla	12	1:55 p. m.	5:40 p. m.	0.98	2:03 p. m.	2:18 p. m.	0.01	0.10	0.51	0.67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jupiter, Fla	26	12:07 p. m.	12:45 p. m.	0.90	12:07 p. m.	12:28 p. m.	0.00	0.11	0.40	0.63	0.82	0.87	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kansas City, Mo	14–15	11:25 p. m.	3:35 a. m.	4.20	12:26 a. m.	1:16 a. m.	0.38	0.14	0.30	0.44	0.72	0.94	1.13	1.36	1.51	1.82	1.55	.....	.....	.....	.....
					1:16 a. m.	2:56 a. m.	.....	1.58	1.71	1.89	1.91	1.93	2.00	2.13	2.19	2.41	2.58	2.71	3.15	3.69	.....
Keokuk, Iowa	16	1:10 a. m.	6:20 a. m.	2.15	2:05 a. m.	2:30 a. m.	0.22	0.18	0.24	0.37	0.43	0.47	.....	.....	.....	.....	.....	.....	.....	.....	.....
					3:30 a. m.	3:50 a. m.	0.77	0.26	0.43	0.77	0.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Key West, Fla	31	.....	.....	0.24	.....	.....	.....	.....	.....	0.22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Knoxville, Tenn	29	10:45 a. m.	12:00 noon.	0.61	11:25 a. m.	11:39 a. m.	0.02	0.07	0.19	0.58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
La Crosse, Wis	21	7:41 a. m.	12:40 p. m.	1.61	9:39 a. m.	10:20 a. m.	0.23	0.09	0.28	0.41	0.46	0.49	0.51	0.69	0.85	0.86	.....	.....	.....	.....	.....
Do	21	2:55 p. m.	5:30 p. m.	2.21	3:39 p. m.	4:21 p. m.	0.30	0.18	0.22	0.26	0.40	0.68	1.04	1.16	1.28	1.33	.....	.....	.....	.....	.....
La Salle, Ill	8	3:00 a. m.	6:40 a. m.	1.88	3:58 a. m.	4:08 a. m.	0.04	0.47	0.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
					4:55 a. m.	5:05 a. m.	0.93	0.25	0.43	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
					5:35 a. m.	5:50 a. m.	1.43	0.16	0.30	0.41	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lexington, Ky	17	7:05 p. m.	11:45 p. m.	1.21	7:30 p. m.	8:14 p. m.	0.01	0.13	0.24	0.28	0.34	0.49	0.65	0.78	0.88	1.00	.....	.....	.....	.....	.....
Lincoln, Nebr	14	1:10 a. m.	3:50 a. m.	0.81	1:29 a. m.	1:59 a. m.	0.06	0.11	0.18	0.33	0.49	0.59	0.67	.....	.....	.....	.....	.....	.....	.....	.....
Do	17–18	11:45 p. m.	3:35 a. m.	1.42	1:02 a. m.	1:25 a. m.	0.47	0.13	0.40	0.57	0.66	0.70	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Rock, Ark	28–29	.....	.....	0.30	.....	.....	.....	.....	.....	.....	.....	.....	0.14	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles, Cal	.....	.....	.....	0.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Louisville, Ky	9	4:52 p. m.	5:25 p. m.	0.67	4:55 p. m.	5:15 p. m.	0.01	0.12	0.41	0.56	0.63	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	15	2:18 a. m.	3:15 a. m.	0.84	2:25 a. m.	2:55 a. m.	0.03	0.23	0.37	0.56	0.65	0.73	0.79	.....	.....	.....	.....	.....	.....	.....	.....
Lynchburg, Va	19	6:45 p. m.	9:10 p. m.	1.08	7:00 p. m.	8:24 p. m.	0.01	0.20	0.38	0.43	0.44	0.44	0.44	0.44	0.44	0.47	0.58	0.74	0.95	1.07	.....
Macon, Ga	13	1:26 p. m.	1:50 p. m.	0.58	1:29 p. m.	1:49 p. m.	0.01	0.23	0.41	0.52	0.57	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Madison, Wis	4–5	11:00 p. m.	D. N.	1.42	12:52 a. m.	1:37 a. m.	0.36	0.23	0.33	0.34	0.38	0.57	0.75	0.84	0.91	0.98	.....	.....	.....	.....	.....
Do	21	5:40 a. m.	7:10 a. m.	1.14	6:06 a. m.	6:41 a. m.	0.01	0.14	0.27	0.44	0.66	0.80	0.93	1.10	.....	.....	.....	.....	.....	.....	.....
Do	21	6:20 p. m.	9:00 p. m.	1.12	6:22 p. m.	6:56 p. m.	0.01	0.30	0.53	0.77	0.83	0.87	0.96	1.04	.....	.....	.....	.....	.....	.....	.....
Marquette, Mich	3	2:07 p. m.	4:15 p. m.	0.99	2:55 p. m.	3:14 p. m.	0.07	0.20	0.26	0.42	0.60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

TABLE IV.—*Accumulated amounts of precipitation for each 5 minutes, etc.*—Continued.

Stations.	Date.	Total duration. From—	Total duration. To—	Total amount of precipitation.	Excessive rate. Began—	Excessive rate. Ended—	Amount before excessive began.	Depths of precipitation (in inches) during periods of time indicated. 5 min.	10 min.	15 min.	20 min.	25 min.	30 min.	35 min.	40 min.	45 min.	50 min.	60 min.	80 min.	100 min.	120 min.
Memphis, Tenn	26-27	D. N.	D. N.	0.94	10:32 p. m.	10:59 p. m.	0.01	0.19	0.36	0.40	0.56	0.83	0.89	.....	.....	.....	.....	.....	.....	.....	.....
Meridian, Miss	2	D. N.	5:50 a. m.	1.67	3:20 a. m.	4:10 a. m.	0.04	0.24	0.26	0.41	0.56	0.69	0.91	1.05	1.20	1.30	1.37	.....	.....	.....	.....
Do	27	4:15 p. m.	5:30 p. m.	0.88	4:22 p. m.	4:54 p. m.	0.02	0.12	0.19	0.22	0.39	0.57	0.69	0.75	.....	.....	.....	.....	.....	.....	.....
Milwaukee, Wis	21	7:15 p. m.	11:30 p. m.	1.30	8:18 p. m.	8:51 p. m.	0.08	0.12	0.30	0.53	0.80	0.93	1.03	1.09	.....	.....	.....	0.46	.....	.....	.....
Minneapolis, Minn	14-15	.....	.....	2.76	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mobile, Ala	12	.....	.....	0.31	.....	.....	.....	.....	0.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montgomery, Ala	13	7:15 p. m.	8:20 p. m.	0.90	7:22 p. m.	7:48 p. m.	0.01	0.34	0.66	0.73	0.77	0.85	0.87	.....	.....	.....	.....	.....	.....	.....	.....
Do	26	2:18 p. m.	3:30 p. m.	0.86	2:23 p. m.	3:03 p. m.	0.02	0.21	0.24	0.24	0.24	0.36	0.61	0.71	0.83	.....	.....	.....	.....	.....	.....
Mount Weather, Va	10	9:05 p. m.	11:45 p. m.	0.58	10:42 p. m.	11:02 p. m.	0.02	0.05	0.36	0.44	0.49	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	18	5:30 p. m.	7:15 p. m.	0.72	5:48 p. m.	6:17 p. m.	0.01	0.06	0.25	0.41	0.45	0.55	0.62	0.66	.....	.....	.....	1.22	.....	.....	.....
Nantucket, Mass	20-21	.....	.....	2.45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nashville, Tenn	31	.....	.....	0.12	.....	.....	.....	.....	0.07	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Haven, Conn	26	.....	.....	0.40	.....	.....	.....	.....	.....	.....	.....	.....	0.36	.....	.....	.....	.....	.....	.....	.....	.....
New Orleans, La	9	2:10 p. m.	3:20 p. m.	0.73	2:12 p. m.	2:42 p. m.	0.01	0.18	0.35	0.44	0.51	0.61	0.67	.....	.....	.....	.....	.....	.....	.....	.....
Do	10	10:53 a. m.	11:40 a. m.	1.29	11:01 a. m.	11:30 a. m.	0.02	0.21	0.39	0.81	1.05	1.17	1.25	.....	.....	.....	.....	.....	.....	.....	.....
Do	11	12:12 p. m.	1:29 p. m.	1.88	12:13 p. m.	12:50 p. m.	0.01	0.26	0.58	0.81	1.14	1.45	1.66	1.77	1.33	.....	.....	.....	.....	.....	.....
New York, N. Y	11	.....	.....	0.28	.....	.....	.....	.....	.....	0.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk, Va	12	2:17 p. m.	7:20 p. m.	1.38	3:11 p. m.	3:48 p. m.	0.06	0.13	0.46	0.72	0.85	0.94	1.08	1.20	.....	.....	.....	.....	.....	.....	.....
Do	26-27	7:22 p. m.	D. N.	1.01	7:31 p. m.	7:59 p. m.	0.05	0.21	0.35	0.37	0.44	0.55	0.64	.....	.....	.....	.....	.....	.....	.....	.....
Northfield, Vt	20	.....	.....	0.55	.....	.....	.....	.....	.....	0.29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Head, Wash	3-4	.....	.....	0.15	.....	.....	.....	0.03	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oklahoma, Okla	9	.....	.....	0.42	.....	.....	.....	.....	0.30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Omaha, Nebr	14	4:35 p. m.	7:05 p. m.	1.22	5:30 p. m.	6:17 p. m.	0.03	0.11	0.21	0.32	0.48	0.68	0.86	1.01	1.07	1.12	1.14	.....	.....	.....	.....
Do	16	4:55 a. m.	6:25 a. m.	0.93	5:00 a. m.	5:16 a. m.	T.	0.23	0.59	0.83	0.84	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	18	1:35 a. m.	3:50 a. m.	1.02	1:39 a. m.	1:59 a. m.	T.	0.27	0.57	0.84	1.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Palestine, Tex	2	.....	.....	0.44	.....	.....	.....	.....	.....	0.22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Parkersburg, W. Va	15-16	9:45 p. m.	2:10 a. m.	1.18	1:06 a. m.	1:37 a. m.	0.06	0.03	0.14	0.39	0.69	0.93	1.08	1.11	.....	.....	.....	.....	.....	.....	.....
Do	17	2:39 p. m.	4:30 p. m.	1.09	2:42 p. m.	3:11 p. m.	0.01	0.39	0.55	0.82	0.85	0.96	1.02	.....	.....	.....	.....	.....	.....	.....	.....
Do	19	3:55 p. m.	4:36 p. m.	0.86	4:06 p. m.	4:21 p. m.	0.02	0.33	0.65	0.83	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pensacola, Fla	10	8:45 p. m.	10:35 p. m.	0.86	9:10 p. m.	9:38 p. m.	0.01	0.09	0.18	0.29	0.47	0.64	0.76	.....	.....	.....	.....	.....	.....	.....	.....
Do	26	2:00 p. m.	7:25 p. m.	4.25	2:17 p. m.	3:47 p. m.	0.01	0.16	0.33	0.41	0.48	0.69	0.80	1.12	1.50	1.98	2.30	2.96	3.79	3.95	.....
Peoria, Ill	6	.....	.....	0.71	.....	.....	.....	.....	0.58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Philadelphia, Pa	18	3:27 p. m.	5:40 p. m.	1.06	3:27 p. m.	4:01 p. m.	0.00	0.07	0.12	0.29	0.50	0.68	0.86	0.91	.....	.....	.....	.....	.....	.....	.....
Do	20	11:55 a. m.	1:45 p. m.	1.17	1:19 p. m.	1:39 p. m.	0.29	0.13	0.34	0.71	0.87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburg, Pa	24	5:15 p. m.	6:55 p. m.	0.89	5:32 p. m.	6:04 p. m.	0.01	0.18	0.39	0.63	0.70	0.72	0.73	0.82	.....	.....	.....	.....	.....	.....	.....
Portland, Me	26	.....	.....	0.41	.....	.....	.....	.....	.....	0.36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Portland, Oreg	2	.....	.....	1.00	.....	.....	.....	.....	.....	.....	.....	.....	0.69	.....	.....	.....	.....	.....	.....	.....	.....
Pueblo, Colo	10	.....	.....	0.36	.....	.....	.....	.....	0.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Raleigh, N. C	12-13	.....	.....	0.84	.....	.....	.....	.....	.....	0.19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Richmond, Va	17	1:34 p. m.	4:30 p. m.	1.45	1:36 p. m.	2:45 p. m.	0.01	0.08	0.21	0.39	0.62	0.82	0.90	0.93	0.94	0.96	1.00	1.18	1.38	.....	.....
Rochester, N. Y	8	5:25 p. m.	6:00 p. m.	0.43	5:36 p. m.	5:44 p. m.	T.	0.30	0.41	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sacramento, Cal	.....	.....	.....	0.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo	28	5:10 a. m.	10:25 a. m.	0.92	6:23 a. m	6:48 a. m.	0.15	0.07	0.14	0.34	0.52	0.58	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Paul, Minn	14-15	.....	.....	3.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.66	.....	.....	.....
Salt Lake City, Utah	25-26	.....	.....	0.15	.....	.....	.....	.....	.....	0.04	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Antonio, Tex	11	.....	.....	0.64	.....	.....	.....	.....	.....	0.55	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Diego, Cal	26	.....	.....	0.03	.....	.....	.....	.....	0.01	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sandusky, Ohio	11	6:42 p. m.	7:10 p. m.	0.56	6:44 p. m.	6:58 p. m.	0.01	0.26	0.41	0.54	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	19	4:10 p. m.	5:50 p. m.	1.53	4:55 p. m.	5:23 p. m.	0.06	0.17	0.65	1.00	1.24	1.34	1.44	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Cal	8	.....	.....	T.	.....	.....	.....	.....	.....	.....	.....	.....	T.	.....	.....	.....	.....	.....	.....	.....	.....
Savannah, Ga	3	12:50 p. m.	10:00 p. m.	0.89	12:52 p. m.	1:01 p. m.	0.01	0.33	0.59	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	4	5:10 a. m.	2:50 p. m.	2.09	5:39 a. m.	6:09 a. m.	0.05	0.08	0.23	0.46	0.67	0.82	0.88	.....	.....	.....	.....	.....	.....	.....	.....
Do	11	3:55 p. m.	5:40 p. m.	0.97	4:33 p. m.	5:18 p. m.	0.03	0.13	0.25	0.36	0.55	0.55	0.55	0.61	0.72	0.90	.....	.....	.....	.....	.....
Do	24-25	10:15 p. m.	D. N.	1.16	10:25 p. m.	10:41 p. m.	0.05	0.19	0.51	0.69	0.71	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Scranton, Pa	11	.....	.....	0.48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.44	.....	.....	.....
Seattle, Wash	2-3	.....	.....	0.58	.....	.....	.....	.....	.....	.....	.....	.....	0.14	.....	.....	.....	.....	.....	.....	.....	.....
Shreveport, La	11	.....	.....	0.57	.....	.....	.....	.....	.....	.....	.....	.....	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Spokane, Wash	3	.....	.....	0.50	.....	.....	.....	.....	.....	.....	.....	.....	0.37	.....	.....	.....	.....	.....	.....	.....	.....
Springfield, Ill	28	D. N.	2:00 p. m.	2.33	9:00 a. m.	9:23 a. m.	1.17	0.09	0.20	0.34	0.45	0.51	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springfield, Mo	28	5:20 p. m.	6:10 p. m.	0.54	5:30 p. m.	5:55 p. m.	0.01	0.06	0.14	0.19	0.37	0.53	.....	.....	.....	.....	.....	.....	.....	.....	.....
Syracuse, N. Y	24	8:50 p. m.	D. N.	1.14	9:14 p. m.	10:08 p. m.	0.02	0.09	0.31	0.33	0.34	0.34	0.40	0.44	0.53	0.76	0.99	1.08	.....	.....	.....
Tampa, Fla	25	8:45 a. m.	9:40 a. m.	0.95	8:51 a. m.	9:11 a. m.	0.01	0.26	0.57	0.79	0.91	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	26	2:13 a. m.	7:25 a. m.	2.20	2:15 a. m.	2:55 a. m.	0.02	0.33	0.63	0.95	1.22	1.43	1.65	1.83	1.95	.....	.....	.....	.....	.....	.....
Taylor, Tex	2-3	11:15 p. m.	3:07 a. m.	1.85	11:25 p. m.	12:10 a. m.	0.05	0.27	0.59	0.82	1.11	1.37	1.46	1.55	1.59	1.65	.....	.....	.....	.....	.....
Thomasville, Ga	3	1:45 a. m.	5:54 a. m.	1.36	3:03 a. m.	3:58 a. m.	0.19	0.10	0.22	0.28	0.37	0.49	0.64	0.76	0.84	0.92	1.01	1.11	.....	.....	.....
Do	22-23	11:50 p. m.	6:30 a. m.	3.69	3:22 a. m.	4:12 a. m.	0.11	0.12	0.17	0.20	0.31	0.42	0.48	0.62	0.74	0.84	0.90	.....	.....	.....	.....
					4:12 a. m.	5:02 a. m.	.....	1.03	1.22	1.52	1.80	2.03	2.10	2.20	2.31	2.41	2.45	.....	.....	.....	.....
					5:02 a. m.	6:00 a. m.	.....	2.46	2.48	2.56	2.60	2.61	2.62	2.67	2.78	3.06	3.20	3.46	.....	.....	.....
Toledo, Ohio	11	5:00 p. m.	6:30 p. m.	1.02	5:02 p. m.	5:22 p. m.	0.01	0.19	0.65	0.80	0.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Topeka, Kans	27	.....	.....	1.13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.55	.....	.....	.....
Valentine, Nebr	6	1:45 a. m.	2:30 a. m.	1.07	1:50 a. m.	2:14 a. m.	0.01	0.13	0.37	0.62	0.89	1.01	.....	.....	.....	.....	.....	.....	.....	.....	.....
Do	9-10	11:25 p. m.	1:47 a. m.	1.59	11:25 p. m.	12:05 a. m.	0.00	0.24	0.55	0.64	0.78	0.93	1.17	1.29	1.35	.....	.....	.....	.....	.....	.....
					2:34 a. m.	3:24 a. m.	0.67	0.12	0.21	0.35	0.42	0.59	0.84	1.16	1.42	1.44	1.48	.....	.....	.....	.....
Vicksburg, Miss	13	D. N.	9:18 a. m.	7.55	3:24 a. m.	4:43 a. m.	.....	1.53	1.62	1.74	1.98	2.28	2.44	2.60	2.91	3.07	3.19	3.48	4.22	.....	.....
					5:18 a. m.	7:09 a. m.	5.03	0.08	0.21	0.43	0.58	0.73	0.90	1.03	1.14	1.24	1.27	1.35	1.83	2.08	2.35
Washington, D. C	29	.....	.....	0.89	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.80	.....	.....	.....
Wichita, Kans	14	12:25 a. m.	6:43 a. m.	1.85	3:44 a. m.	4:11 a. m.	0.23	0.14	0.38	0.52	0.55	0.67	0.71	.....	.....	.....	.....	.....	.....	.....	.....
					5:03 a. m.	5:24 a. m.	1.21	0.09	0.21	0.33	0.52	0.54	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wilmington, N. C	10	4:05 p. m.	7:00 p. m.	1.26	4:07 p. m.	4:47 p. m.	0.01	0.17	0.47	0.74	0.90	0.92	0.96	1.02	1.13	.....	.....	.....	.....	.....	.....
Do	24	1:15 a. m.	D. N.	1.34	1:58 a. m.	2:43 a. m.	0.04	0.17	0.26	0.29	0.32	0.45	0.55	0.68	0.79	0.94	.....	.....	.....	.....	.....
Wytheville, Va	11	2:40 p. m.	3:08 p. m.	0.64	2:45 p. m.	3:00 p. m.	0.01	0.16	0.41	0.60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yankton, S. Dak	10	D. N.	7:25 a. m.	1.79	5:24 a. m.	6:10 a. m.	0.25	0.07	0.12	0.19	0.38	0.53	0.75	1.10	1.29	1.44	.....	.....	.....	.....	.....
Do	13	7:40 p. m.	8:20 p. m.	0.72	7:49 p. m.	8:05 p. m.	0.02	0.08	0.30	0.66	0.69	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Juan, Porto Rico	31	5:06 p. m.	5:40 p. m.	0.51	5:17 p. m.	5:31 p. m.	0.03	0.15	0.33	0.47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

• Self-register not working.

TABLE V.—*Data furnished by the Canadian Meteorological Service, July, 1907.*

Stations.	Pressure, in inches.			Temperature.				Precipitation.			Stations.	Pressure, in inches.			Temperature.				Precipitation.		
	Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hours.	Departure from normal.	Mean.	Departure from normal.	Mean maximum.	Mean minimum.	Total.	Departure from normal.	Total snowfall.		Actual, reduced to mean of 24 hours.	Sea level, reduced to mean of 24 hours.	Departure from normal.	Mean.	Departure from normal.	Mean maximum.	Mean minimum.	Total.	Departure from normal.	Total snowfall.
	Ins.	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*		*Ins.*	*Ins.*	*Ins.*	°	°	°	°	*Ins.*	*Ins.*	*Ins.*
St. Johns, N. F.	29.72	29.86	—.11	54.8	— 4.5	60.4	49.1	3.97	+0.08		Parry Sound, Ont	29.20	29.88	—.08	68.7	+ 2.7	81.2	56.2	1.15	—1.47	
Sydney, C. B. I.	29.85	29.89	—.04	60.9	— 1.4	69.3	52.5	4.95	+1.30		Port Arthur, Ont.	29.17	29.88	—.06	62.9	+ 0.9	74.8	51.0	5.94	+2.46	
Halifax, N. S.	29.74	29.84	—.12	62.8	— 0.6	71.4	54.3	3.40	—0.65		Winnipeg, Man	29.05	29.86	—.07	67.2	+ 1.2	78.9	55.5	3.98	+0.90	
Grand Manan, N. B	29.76	29.81	—.12	60.9	— 0.8	68.5	53.3	3.55	+0.55		Minnedosa, Man	28.09	29.87	—.06	62.1	— 0.1	74.3	49.8	2.76	+0.16	
Yarmouth, N. S.	29.79	29.86	—.09	59.0	— 0.5	65.8	52.2	2.00	—1.62		Qu'Appelle, Sask										
Charlottetown, P. E. I.	29.78	29.82	—.08	63.2	— 0.9	69.7	56.6	5.18	+1.69		Medicine Hat, Alberta.	27.64	29.88	—.02	67.0	— 0.8	79.6	54.5	0.92	—1.17	
Chatham, N. B	29.77	29.79	—.09	65.2	+ 0.2	74.1	56.3	7.08	+2.89		Swift Current, Sask.	27.41	29.94	+.03	63.1	— 3.4	76.9	49.3	1.37	—1.07	
Father Point, Que.	29.74	29.76	—.09	56.4	— 1.2	63.6	49.2	5.70	+2.66		Calgary, Alberta	26.45	29.93	+.03	60.3	— 0.3	74.6	45.9	0.85	—1.83	
Quebec, Que.	29.47	29.78	—.13	66.3	+ 0.8	75.2	57.4	6.56	+2.30		Banff, Alberta	25.44	29.97	+.07	56.6	0.0	71.1	42.0	1.90	—1.34	
Montreal, Que.	29.59	29.79	—.14	69.4	+ 0.9	77.6	61.2	3.30	—0.99		Edmonton, Alberta										
Rockliffe, Ont.	29.24	29.84	—.10	65.7	+ 0.1	77.6	53.8	4.74	+1.62		Prince Albert, Sask.	28.28	29.81	—.10	61.8	— 0.1	73.2	50.4	2.21	+0.16	
Ottawa, Ont	29.56	29.87	—.07	69.3	— 0.2	79.2	59.3	3.23	—0.24		Battleford, Sask.	28.16	29.87	—.03	63.8	— 0.9	76.7	50.8	2.26	—0.08	
Kingston, Ont.	29.56	29.86	—.11	66.5	— 1.7	73.2	59.7	1.82	—1.07		Kamloops, B. C.	28.74	29.93	—.01	70.8	+ 2.3	85.1	56.6	1.18	—0.43	
Toronto, Ont	29.51	29.87	—.10	69.3	+ 1.3	80.7	57.9	2.08	—0.84		Victoria, B. C.	29.91	30.00	—.05	62.9	+ 2.9	73.6	52.2	0.39	—0.01	
White River, Ont	28.51	29.79	—.15	59.5	0.0	72.6	46.3	2.97	+0.17		Barkerville, B. C.										
Port Stanley, Ont	29.29	29.92	—.06	67.0	— 0.8	76.3	57.7	3.58	+0.54		Hamilton, Bermuda	29.99	30.15	+.01	78.8	+ 0.4	83.1	74.4	2.24	—2.20	
Saugeen, Ont.	29.21	29.91	—.06	64.4	— 0.3	73.4	55.4	0.76	—1.22		Dawson, Yukon										

TABLE VI.—*Heights of rivers referred to zeros of gages, July, 1907.*

Stations.	Distance to mouth of river.	Flood stage on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.	Stations.	Distance to mouth of river.	Flood stage on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.						Height.	Date.	Height.	Date.		
Yellowstone River.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*	*Cumberland River*—Cont'd.	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Billings, Mont.	330	8	8.6	6	5.9	30, 31	7.2	2.7	Carthage, Tenn.	308	40	3.4	2	1.3	29	2.1	2.1
James River.									Nashville, Tenn.	193	40	11.0	3	7.6	27–29	8.2	3.4
Huron, S. Dak.	139	9	2.1	1, 2	0.6	27–31	1.2	1.5	Clarksville, Tenn.	126	43	6.6	2	2.1	31	4.3	4.5
Big Blue River.									*Clinch River.*								
Blue Rapids, Kans.	47	14	19.5	17	4.4	12	8.0	15.1	Speers Ferry, Va.	156	20	1.7	14	0.1	8-11,22-24	0.5	1.6
Republican River.									Clinton, Tenn	52	25	7.9	13	3.8	11, 25, 26	5.0	4.1
Clay Center, Kans.	42	18	9.9	17, 29	5.4	14–16	6.6	4.5	*South Fork Holston River.*								
Smoky Hill-Kansas River.									Bluff City, Tenn.	35	12	5.4	13	1.2	9, 10	2.2	4.2
Lindsborg, Kans.	318	20	13.9	20	2.4	14	5.5	11.5	*Holston River.*								
Abilene, Kans.	254	22	8.7	1	0.6	14–16	3.2	8.1	Rogersville, Tenn.	103	14	4.4	14	2.0	10	2.8	2.4
Manhattan, Kans	160	18	11.5	18	3.2	9-11, 13, 14	5.3	8.3	*French Broad River.*								
Topeka, Kans.	87	21	12.2	20	6.4	12, 13	8.0	5.8	Asheville, N. C.	144	4	0.1	30	— 0.4	{8–10, 15, 23–25, 28}	—0.2	0.5
Missouri River.									Dandridge, Tenn.	46	12	3.7	13	0.9	11, 12, 27–29	1.5	2.8
Townsend, Mont.	2,504	11	8.5	1, 2	6.1	31	7.3	2.4	*Tennessee River.*								
Fort Benton, Mont.	2,285	12	9.2	1	4.0	27, 28	6.4	5.2	Knoxville, Tenn.	635	12	6.2	14	1.3	11	2.6	4.9
Wolfpoint, Mont.	1,952	17	6.9	10	3.5	31	5.5	3.4	Loudon, Tenn	590	25	4.9	14, 15	1.8	12	2.6	3.1
Bismarck, N. Dak.	1,309	14	11.0	1	7.8	31	9.6	3.2	Kingston, Tenn.	556	25	4.8	15	2.0	10–12	2.7	2.8
Pierre, S. Dak.	1,114	14	10.0	1	7.3	25	8.5	2.7	Chattanooga, Tenn.	452	33	7.4	15	3.3	29	4.7	4.1
Sioux City, Iowa	784	17	14.2	1	10.9	29, 30	12.7	3.3	Bridgeport, Ala	402	24	4.9	17	1.8	12	2.9	3.1
Blair, Nebr.	705	15	13.7	5, 16	11.3	29–31	12.8	2.4	Guntersville, Ala.	349	31	8.5	17	3.9	12, 30	5.5	4.6
Omaha, Nebr.	669	18	17.3	4, 18	14.9	30, 31	16.4	2.4	Florence, Ala.	255	16	4.7	18	1.3	30	2.8	3.4
Plattsmouth, Nebr.	641	17	11.2	18	7.8	31	9.7	3.4	Riverton, Ala.	225	26	7.4	18	3.3	30, 31	5.2	4.1
St. Joseph, Mo	481	10	13.6	20	8.7	1	11.2	4.9	Johnsonville, Tenn.	95	21	6.6	5	3.3	31	5.1	3.3
Kansas City, Mo.	388	21	23.7	20	17.4	2	20.4	6.3	*Ohio River.*								
Glasgow, Mo.	231	18	19.6	22	14.1	3	16.6	5.5	Pittsburg, Pa.	966	22	13.4	19	3.1	30	5.8	10.3
Boonville, Mo.	199	20	22.2	23	15.9	4	18.7	6.3	Dam No. 2, Pa.	956	25	13.2	19	2.9	8–11	6.0	10.3
Hermann, Mo.	103	24	19.5	23, 24	15.0	5	17.0	4.5	Beaver Dam, Pa.	925	27	18.5	19	5.2	8	8.9	13.3
Minnesota River.									Wheeling, W. Va.	875	36	18.0	20	5.0	9	9.0	13.0
Mankato, Minn.	127	18	10.7	1	5.8	14	7.7	4.9	Parkersburg, W. Va.	785	36	21.6	21	7.2	8, 9	11.1	14.4
St. Croix River.									Point Pleasant, W. Va.	703	39	23.1	21	6.5	9, 10	11.8	16.6
Stillwater, Minn.	23	11	10.3	2–4	5.8	14	7.5	4.5	Huntington, W. Va	660	50	26.4	22	10.5	11	15.7	15.9
Illinois River.									Catlettsburg, Ky.	651	50	26.7	22	9.3	10	15.6	17.4
La Salle, Ill.	197	18	20.4	13	14.8	5–7	17.4	5.6	Portsmouth, Ohio	612	50	27.3	22	10.7	11	16.6	16.6
Peoria, Ill.	135	14	15.3	18	11.9	8, 9	13.8	3.4	Maysville, Ky.	559	50	25.7	23	11.0	11	16.5	14.7
Beardstown, Ill.	70	12	13.9	27	10.6	12–14	12.1	3.3	Cincinnati, Ohio.	499	50	27.7	23	13.2	7	18.3	14.5
Conemaugh River.									Madison, Ind	413	46	22.7	24	11.5	8	15.6	11.2
Johnstown, Pa.	64	7	3.7	12	1.6	22, 23	2.1	2.1	Louisville, Ky.	367	28	10.3	25	5.4	7, 8	7.2	4.9
Allegheny River.									Evansville, Ind.	184	35	20.0	27	9.7	10	13.4	10.3
Warren, Pa.	177	14	3.4	13	0.1	30, 31	1.1	3.3	Mount Vernon, Ind.	148	35	19.0	27	9.2	11	13.8	9.8
Parker, Pa.	73	20	3.8	2, 3	1.1	24, 31	1.8	2.7	Paducah, Ky.	47	40	19.5	29	10.4	12, 13	14.6	9.1
Freeport, Pa.	29	20	6.9	3	2.5	24	3.8	4.4	Cairo, Ill.	1	45	32.6	29	23.0	14	27.4	9.6
Youghiogheny River.									*Neosho River.*								
Confluence, Pa.	59	10	5.0	18	0.5	10	1.8	4.5	Iola, Kans.	262	10	2.2	1	— 0.3	26	0.4	2.5
West Newton, Pa.	15	23	6.6	18	0.4	11	2.2	6.2	Oswego, Kans.	184	20	7.2	1	0.3	31	1.4	6.9
Monongahela River.									Fort Gibson, Ind. T.	3	22	19.2	1	9.0	29–31	10.9	10.2
Fairmont, W. Va.	119	25	24.1	18	14.7	1	16.7	9.4	*Canadian River.*								
Greensboro, Pa.	81	18	22.5	18	7.5	9, 10	10.1	15.0	Calvin, Ind. T.	99	10	4.9	1	2.8	20, 30	3.5	2.1
Lock No. 4, Pa.	40	28	26.0	19	6.8	8–10	11.4	19.2	*Black River.*								
Muskingum River.									Blackrock, Ark.	67	12	7.4	1	3.7	29–31	4.8	3.7
Zanesville, Ohio	70	25	18.4	27	8.4	10	10.8	10.0	*White River.*								
Little Kanawha River.									Calicorock, Ark	272	18	9.5	4	0.6	27	2.5	8.9
Creston, W. Va.	38	20	10.9	21	2.8	8, 9	4.8	8.1	Batesville, Ark.	217	18	10.8	5	2.7	26-28, 30, 31	4.7	8.1
New-Great Kanawha River.									Clarendon, Ark.	75	30	22.5	1	11.7	31	17.7	10.8
Hinton, W. Va.	153	14	3.0	20	1.8	27	2.3	1.2	*Arkansas River.*								
Charleston, W. Va.	58	30	8.4	13	4.6	24	6.9	3.8	Wichita, Kans.	832	10	0.8	20	— 1.2	13	—0.6	2.0
Scioto River.									Tulsa, Ind. T.	551	16	9.0	1	3.6	18, 30, 31	4.6	5.4
Columbus, Ohio	110	17	13.8	18	2.0	1–6	4.4	11.8	Webbers Falls, Ind. T.	465	23	17.0	1, 2	4.4	31	7.7	12.6
Licking River.									Fort Smith, Ark.	403	22	17.4	2	3.4	31	7.3	14.0
Falmouth, Ky.	30	25	6.0	14	1.6	6–8	3.1	4.4	Dardanelle, Ark.	256	21	17.8	1	3.8	31	7.6	14.0
Kentucky River.									Little Rock, Ark.	176	23	18.6	3	5.0	31	9.2	13.6
Beattyville, Ky	254	30	2.5	12	0.2	5, 6, 24	0.8	2.3	Pine Bluff, Ark.	121	25	21.2	4	8.0	31	12.4	13.2
Frankfort, Ky.	65	31	8.0	14	5.6	7, 9, 10	6.2	2.4	*Yazoo River.*								
Wabash River.									Greenwood, Miss	175	38	16.7	1	3.8	29, 31	7.5	12.9
Mount Carmel, Ill.	75	15	11.9	22	3.1	11	6.6	8.8	Yazoo City, Miss.	80	25	20.3	1	3.0	24–28	9.7	17.3
Cumberland River.									*Ouachita River.*								
Burnside, Ky.	518	50	2.0	15, 31	0.3	25, 26	0.9	1.7	Camden, Ark.	304	39	22.3	5	4.6	30, 31	8.9	17.7
Celina, Tenn.	383	45	2.7	1	1.3	29	1.8	1.4	Monroe, La	122	40	31.6	1	7.9	31	21.3	23.7

TABLE VI.—*Heights of rivers referred to zeros of gages*—Continued.

Stations.	Distance to mouth of river.	Flood stage on gage.	Highest water.		Lowest water.		Mean stage.	Monthly range.
			Height.	Date.	Height.	Date.		
Red River	*Miles.*	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Denison, Tex.	768	22	10.4	11	1.8	30, 31	4.3	8.6
Arthur City, Tex.	688	27	20.8	12	7.8	31	11.1	13.0
Fulton, Ark.	515	28	24.4	14	9.5	31	15.6	14.9
Shreveport, La.	327	29	14.8	16, 17	4.5	31	10.1	10.3
Alexandria, La.	118	33	20.5	1–3	10.0	31	16.6	10.5
Mississippi River.								
Fort Ripley, Minn.	2,082	10	6.1	1	4.8	22	5.2	1.3
St. Paul, Minn.	1,954	14	10.1	1	5.9	31	7.1	4.2
Red Wing, Minn.	1,914	14	7.1	1–4	4.1	31	5.3	3.0
Reeds Landing, Minn.	1,884	12	6.6	1	4.0	30	5.1	2.6
La Crosse, Wis.	1,819	12	8.0	10, 11	5.2	31	6.7	2.8
Prairie du Chien, Wis.	1,759	18	8.9	12–14	6.6	31	8.0	2.3
Dubuque, Iowa.	1,699	15	9.5	15, 16	7.5	31	8.7	2.0
Clinton, Iowa.	1,629	16	9.4	13	7.4	1	8.3	2.0
Leclaire, Iowa.	1,609	10	7.1	13, 14	4.2	1	5.9	2.9
Davenport, Iowa.	1,593	15	8.8	12, 13	6.6	1–4	7.7	2.2
Muscatine, Iowa.	1,562	16	10.5	13, 14	7.8	4, 5	9.3	2.7
Galland, Iowa.	1,472	8	6.5	21	3.8	5–8	5.1	2.7
Keokuk, Iowa.	1,463	15	13.5	21	6.9	5, 6	9.8	6.6
Warsaw, Ill.	1,458	18	16.5	21	9.9	6	12.9	6.6
Hannibal, Mo.	1,402	13	14.7	23	7.9	7, 8	11.2	6.8
Grafton, Ill.	1,306	23	17.9	25, 26, 29	10.7	9–14	14.1	7.2
St. Louis, Mo.	1,264	30	28.1	25	19.9	7	23.6	8.2
Chester, Ill.	1,189	30	24.0	26	16.7	7	20.0	7.3
New Madrid, Mo.	1,003	34	27.0	29, 30	19.2	14	22.8	7.8
Luxora, Ark.	905	33	19.7	31	12.2	12, 13	15.5	7.5
Memphis, Tenn.	843	33	25.3	31	17.2	16	21.0	8.1
Helena, Ark.	767	42	34.6	1	23.0	17	27.7	11.6
Arkansas City, Ark.	635	42	41.1	1	28.1	20	33.4	13.0
Greenville, Miss.	595	42	34.9	1	22.8	20, 21	27.8	12.1
Vicksburg, Miss.	474	45	40.0	2	26.3	23	32.6	13.7
Natchez, Miss.	373	46	40.9	2, 3	28.0	25	34.5	12.9
Baton Rouge, La.	240	35	31.0	3–6	20.6	27	26.3	10.4
Donaldsonville, La.	188	28	24.2	1–5	15.3	27	20.3	8.9
New Orleans, La.	108	16	15.7	1–5	10.1	27, 29	13.0	5.6
Atchafalaya River.								
Simmesport, La.	127	33	36.3	1	25.9	30	31.4	10.4
Melville, La.	103	31	33.8	1	27.8	26–29	31.1	6.0
Mohawk River.								
Schenectady, N. Y.	19	15	1.9	21	0.4	1, 17, 27	1.0	1.5
Hudson River.								
Troy, N. Y.	154	14	3.7	23	2.5	18	3.1	1.2
Albany, N. Y.	147	12	4.6	26, 27	1.4	20	3.3	3.2
Delaware River.								
Hancock (E. Branch), N. Y.	287	12	.....	.....	.....	.....	.....	.....
Hancock (W. Branch), N. Y.	287	10	3.5	1, 13	2.5	30	3.0	1.0
Port Jervis, N. Y.	215	14	1.0	2	— 0.3	31	0.3	1.3
Phillipsburg, N. J.	146	26	2.4	1	0.4	28, 29, 31	1.1	2.0
Trenton, N. J.	92	18	1.5	1, 2	0.8	30, 31	1.2	0.7
North Branch Susquehanna.								
Binghamton, N. Y.	183	16	3.2	14	2.0	11	2.3	1.2
Towanda, Pa.	139	16	2.5	2, 13	0.8	1	1.6	1.7
Wilkes-Barre, Pa.	60	17	5.2	3	3.3	25, 26, 31	3.9	1.9
West Branch Susquehanna.								
Renovo, Pa.	90	16	5.2	1	0.7	25, 31	2.0	4.5
Williamsport, Pa.	39	20	6.0	2	1.0	28	2.3	5.0
Susquehanna River.								
Harrisburg, Pa.	69	17	3.7	4	1.4	28–30	2.2	2.3
Shenandoah River.								
Riverton, Va.	58	22	— 0.4	1–5	— 1.1	27–31	—0.7	0.7
Potomac River.								
Harpers Ferry, W. Va.	172	18	3.8	20	0.8	18, 19	1.8	3.0
James River.								
Buchanan, Va.	305	12	3.3	1	2.3	28–31	2.7	1.0
Lynchburg, Va.	260	18	2.3	20	1.1	30, 31	1.5	1.2
Columbia, Va.	167	18	5.6	1	3.1	28, 31	4.1	2.5
Richmond, Va.	111	12	1.4	1	0.0	27	0.6	1.4
Roanoke River.								
Clarksville, Va.	196	12	2.0	1	0.0	30, 31	0.8	2.0
Weldon, N. C.	129	30	13.6	1	10.0	27	11.1	3.6
Tar River.								
Greenville, N. C.	21	22	12.8	4	4.7	31	7.9	8.1
Cape Fear River.								
Fayetteville, N. C.	112	38	14.0	2	2.3	26	5.7	11.7
Pedee River.								
Cheraw, S. C.	149	27	10.2	1	1.9	26	4.3	8.3
Smiths Mills, S. C.	51	16	12.6	7–9	5.0	30	9.5	7.6
Lynch Creek.								
Effingham, S. C.	35	12	10.0	5	4.3	29, 30	6.8	5.7
Black River.								
Kingstree, S. C.	45	12	9.3	26	4.0	31	6.2	5.3
Catawba-Wateree River.								
Mount Holly, N. C.	143	15	3.2	15	1.8	23–31	2.1	1.4
Catawba, S. C.	107	11	5.5	1	1.7	23	2.8	3.8
Camden, S. C.	37	24	14.0	16	5.0	11, 12, 24	7.8	9.0
Congaree River.								
Columbia, S. C.	52	15	4.0	27	0.9	10	1.7	3.1
Santee River.								
St. Stephens, S. C.	50	10	8.8	9	4.1	27	7.2	4.7
Savannah River.								
Augusta, Ga.	268	32	11.0	1	6.2	11, 12	7.9	4.8
Oconee River.								
Dublin, Ga.	79	30	6.5	31	— 1.1	12	1.6	7.6
Ocmulgee River.								
Macon, Ga.	203	18	8.2	4	1.0	25, 26	2.8	7.2
Flint River.								
Montezuma, Ga.	152	20	11.6	2	3.2	27	4.1	8.4
Albany, Ga.	90	20	7.2	6	1.0	28	3.3	6.2
Bainbridge, Ga.	29	22	7.5	8, 9	3.2	26	4.7	4.3
Chattahoochee River.								
West Point, Ga.	239	20	6.5	15	1.9	26	2.9	4.6
Eufaula, Ala.	90	40	12.8	4	2.2	25	4.6	10.6
Alaga, Ala.	30	25	13.9	5	3.7	25	6.4	10.2
Coosa River.								
Rome, Ga.	266	30	4.2	15	1.4	25	2.3	2.8
Gadsden, Ala.	162	22	4.5	14	1.7	26	2.9	2.8
Lock No. 4, Ala.	113	17	4.2	15	1.2	26, 27	2.2	3.0
Wetumpka, Ala.	12	45	10.6	3	4.2	26	6.3	6.4
Alabama River.								
Montgomery, Ala.	323	35	7.5	4	2.3	26	4.1	5.2
Selma, Ala.	246	35	9.4	5	3.0	27	5.3	6.4
Black Warrior River.								
Tuscaloosa, Ala.	90	43	11.3	16	5.7	31	6.9	5.6
Tombigbee River.								
Columbus, Miss.	316	33	— 0.1	15	— 2.3	12	—1.5	2.2
Demopolis, Ala.	168	35	6.8	18	1.2	28	3.1	5.6
Pascagoula River.								
Merrill, Miss.	78	20	11.2	31	3.0	24	5.4	8.2
Pearl River.								
Columbia, Miss.	110	14	6.2	31	4.0	25–28	4.8	2.2
Sabine River.								
Logansport, La.	315	25	10.8	15	2.5	31	5.5	8.3
Neches River.								
Beaumont, Tex.	18	10	1.7	1, 10, 19	0.2	31	1.3	1.5
Trinity River.								
Dallas, Tex.	320	25	30.3	13, 14	4.0	30	10.3	26.3
Long Lake, Tex.	211	35	25.0	25	4.9	31	16.2	20.1
Liberty, Tex.	20	25	22.8	1	7.0	18, 19	12.1	15.8
Brazos River.								
Waco, Tex.	285	22	11.4	15	3.7	11	5.7	7.7
Valley Junction, Tex.	215	40	8.0	15	0.9	5–14	2.2	7.1
Hempstead, Tex.	140	40	13.8	18	0.9	16	4.7	12.9
Booth, Tex.	61	39	5.5	7–12	4.2	16	4.9	1.3
Colorado River.								
Austin, Tex.	214	18	10.1	14	1.4	31	3.3	8.7
Columbus, Tex.	98	24	23.2	16	7.6	14, 30	10.6	15.6
Rio Grande.								
San Marcial, N. Mex.	1233	11	10.3	6	8.5	31	9.5	1.8
El Paso, Tex.	1030	14	11.4	8–10	10.1	29, 30	10.9	1.3
Colorado River.								
Yuma, Ariz.	86	.....	28.4	1	22.8	29–31	26.4	5.6
Red River of the North.								
Moorhead, Minn.	284	26	11.3	1	9.1	31	9.9	2.2
Snake River.								
Lewiston, Idaho.	144	24	13.1	1	6.0	31	9.5	7.1
Columbia River.								
Wenatchee, Wash.	473	40	34.9	5, 6	25.4	31	31.2	9.5
Umatilla, Oreg.	270	25	19.0	5, 6	12.7	31	16.2	6.3
The Dalles, Oreg.	166	40	31.5	6	19.4	31	26.3	12.1
Willamette River.								
Albany, Oreg.	118	20	2.2	4	1.1	30, 31	1.6	1.1
Portland, Oreg.	12	15	17.5	7, 8	10.5	31	14.8	7.0
Sacramento River.								
Red Bluff, Cal.	265	23	2.7	1, 2	1.5	29–31	2.1	1.2
Sacramento, Cal.	64	25	17.8	1	12.0	31	14.9	5.8

(c) Three days missing.

Honolulu, T. H., latitude 21° 19′ north, longitude 157° 30′ west; barometer above sea, 38 feet; gravity correction, —0.057 inch, applied. July, 1907.

Day.	Pressure.*		Air temperature.				Moisture.				Wind.				Precipitation.		Clouds.					
							8 a. m.		8 p. m.		8 a. m.		8 p. m.				8 a. m.			8 p. m.		
	8 a. m.	8 p. m.	8 a. m.	8 p. m.	Maximum.	Minimum.	Wet.	Relative humidity.	Wet.	Relative humidity.	Direction.	Velocity.	Direction.	Velocity.	8 a. m.	8 p. m.	Amount.	Kind.	Direction.	Amount.	Kind.	Direction.
1	30.00	29.97	77.0	76.0	82	73	69.5	69	69.0	70	ne.	6	ne.	7	0.02	0.00	4	S.-cu.	ne.	0	0	0
2	30.01	30.01	79.8	77.0	83	74	70.4	62	69.0	67	e.	5	ne.	7	0.00	0.00	2 1	A.-s. Cu.	0 e.	0	0	0
3	30.05	30.01	77.5	76.1	82	73	70.0	69	66.1	59	e.	6	se.	9	T.	0.00	5	Cu.	e.	0	0	0
4	30.04	30.00	78.0	75.5	82	73	68.0	60	68.0	68	ne.	7	ne.	7	0.00	0.00	4	Cu.	e.	0	0	0
5	30.04	30.00	75.5	76.0	82	70	67.5	66	68.0	66	ne.	7	ne.	11	0.14	T.	4	Cu.	e.	few.	S.-cu.	ne.
6	30.06	30.02	78.0	75.5	82	71	67.0	56	68.0	68	ne.	5	ne.	9	0.01	0.00	2	Cu.	ne.	1	Cu.	ne.
7	30.06	30.02	79.5	76.0	83	74	69.0	58	68.0	66	e.	3	ne.	7	0.00	0.00	2	Cu.	e.	3	Cu.	ne.
8	30.03	29.98	78.0	75.5	82	72	69.0	63	68.0	68	ne.	6	ne.	12	T.	0.00	1	Cu.	e.	1	Cu.	ne.
9	29.96	29.94	77.0	76.0	82	73	68.5	65	68.0	66	ne.	5	ne.	8	0.00	0.02	1 4	S.-cu. Cu.	ne. ne.	1	A.-s.	0
10	29.93	29.96	79.0	74.0	82	73	69.0	60	68.0	74	ne.	9	ne.	8	0.01	0.00	2	Cu.	ne.	1 0	S. 0	ne. 0
11	30.00	30.01	80.0	77.0	83	71	71.0	64	71.0	74	e.	3	e.	13	0.00	0.05	5	Cu.	ne.	9	N.	ne.
12	30.07	30.08	79.0	77.0	83	72	70.2	65	70.0	71	ne.	8	ne.	6	0.23	T.	4 2	Ci.-s. Cu.	0 e.	8	Cu.	ne.
13	30.08	30.04	78.2	75.5	82	74	68.2	60	68.0	68	e.	10	e.	4	0.00	T.	2	Cu.	e.	2	Cu.	e.
14	30.04	29.97	79.0	75.5	82	74	68.0	57	68.0	68	ne.	6	ne.	5	0.00	0.00	6 1	Ci. Cu.	0 e.	few.	Cu.	ne.
15	30.00	29.96	78.7	76.0	82	73	69.0	61	67.0	62	se.	5	ne.	8	T.	0.00	2	Cu.	e.	4	Cu.	ne.
16	29.97	29.99	78.0	75.5	82	73	68.0	60	68.0	68	ne.	8	ne.	9	0.00	0.00	1 1	A.-s. Cu.	0 0	1	Cu.	ne.
17	30.00	30.00	79.0	76.0	82	73	69.0	60	68.0	66	ne.	5	ne.	6	T.	T.	6	A.-cu.	e.	5	Cu.	e.
18	30.03	30.00	75.7	75.0	82	72	67.0	63	69.0	74	e.	12	e.	9	0.01	0.04	8	A.-cu.	e.	8	N.	e.
19	30.01	29.94	75.5	76.0	82	73	69.0	72	70.0	74	ne.	4	se.	9	0.05	0.00	7	A.-cu.	e.	few.	Cu.	ne.
20	29.94	29.88	78.5	77.0	83	74	69.0	62	71.5	77	ne.	12	ne.	12	0.00	0.03	5	Cu.	e.	10	N.	ne.
21	29.87	29.94	80.0	72.0	84	72	71.5	66	71.0	95	ne.	18	se.	4	0.13	0.03	1 2	A.-cu. Cu.	0 e.	10	N.	se.
22	29.98	29.98	78.7	76.5	83	74	72.0	72	69.0	68	ne.	9	ne.	8	0.05	0.00	4	S.-cu.	e.	1	Cu.	ne.
23	30.01	29.98	79.0	76.0	83	74	70.0	64	71.0	78	ne.	9	se.	4	0.00	0.00	2	Cu.	e.	2	Cu.	ne.
24	29.98	29.97	77.4	76.0	83	74	69.2	66	68.5	68	e.	6	e.	3	0.00	0.00	4	Cu.	e.	6	Cu.	e.
25	29.98	29.97	76.5	78.0	82	74	70.0	72	69.0	63	ne.	6	e.	17	T.	0.04	8	S.-cu.	e.	2	Cu.	e.
26	30.02	29.99	78.0	77.5	83	72	71.0	71	70.0	69	ne.	12	e.	11	0.05	0.06	7	S.-cu.	e.	1	Cu.-n.	e.
27	30.02	29.98	79.0	77.0	83	74	70.0	64	69.5	69	ne.	13	ne.	10	T.	0.01	3	Cu.	ne.	3	S.	ne.
28	29.96	29.93	80.0	76.0	82	75	70.0	61	68.0	66	e.	7	e.	12	0.00	0.00	1 1	A.-s. Cu.	0 e.	0	0	0
29	29.95	29.88	79.5	76.5	84	74	70.0	62	73.0	84	e.	3	n.	6	0.00	T.	4	Cu.	ne.	4	N.	ne.
30	29.94	30.01	80.0	80.0	84	75	75.5	81	73.0	72	w.	3	ne.	6	T.	0.00	7	S.-cu.	s.	5	S.	sw.
31	30.06	30.09	80.7	78.0	84	76	73.0	70	73.0	79	ne.	6	e.	8	T.	T.	8 1	A.-s. Cu.	w. e.	4	S.	ne.
Mean....	30.003	29.984	78.4	76.2	82.6	73.2	69.6	64.5	69.2	70.5	ne.	7.2	ne.	8.2	0.70	0.28	4.4	Cu.	e.	3.0	Cu.	ne.

Observations are made at 8 a.m. and 8 p. m., local standard time, which is that of 157° 30′ west, and is 5h and 30m slower than 75th meridian time. *Pressure values are reduced to sea level and standard gravity.

RAINFALL IN JAMAICA.

Thru the kindness of Mr. Maxwell Hall, meteorologist to the government of Jamaica and now in charge of the meteorological service of that island, we have received the following table.

The rainfall for July was a little below the average thruout the island. The maximum rainfall recorded was at Moore Town, in the northeastern division, 16.83 inches. No rain fell at Pedro Plains and Old Harbor, in the southern division, and at two or three places in the northern division almost *nil* was recorded.

Comparative table of rainfall.

[Based upon the average stations only.]

JULY, 1907.

Divisions.	Relative area.	Number of stations.	Rainfall.	
			1907.	Average.
	Per cent.		*Inches.*	*Inches.*
Northeastern division	25	17	5.89	7.06
Northern division	22	41	2.34	3.10
West-central division	26	20	5.73	8.18
Southern division	27	26	3.07	4.81
Means			4.26	5.79

Chart I. Hydrographs for Seven Principal Rivers of the United States, July, 1907.

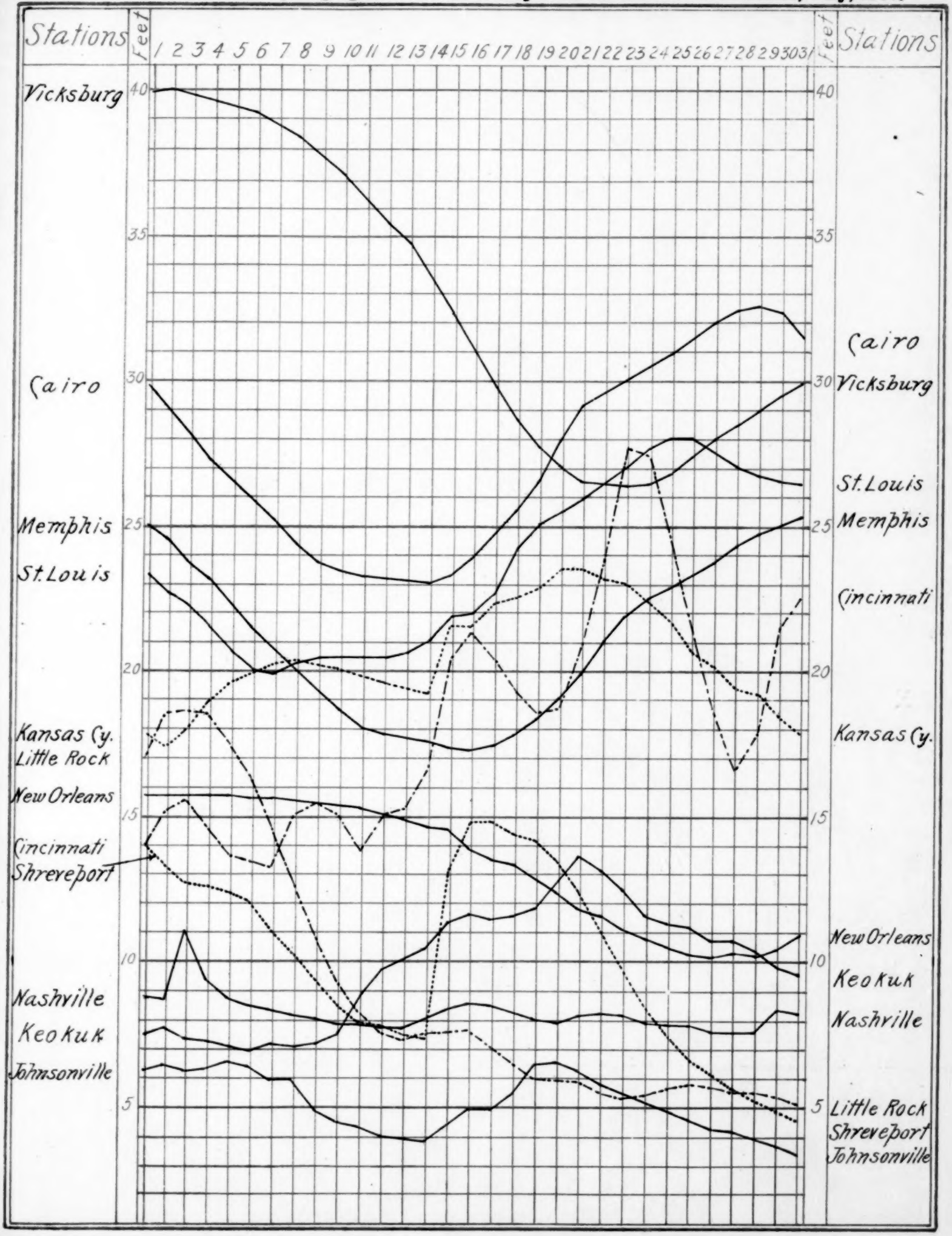


Chart II. Tracks of Centers of High Areas, July, 1907.

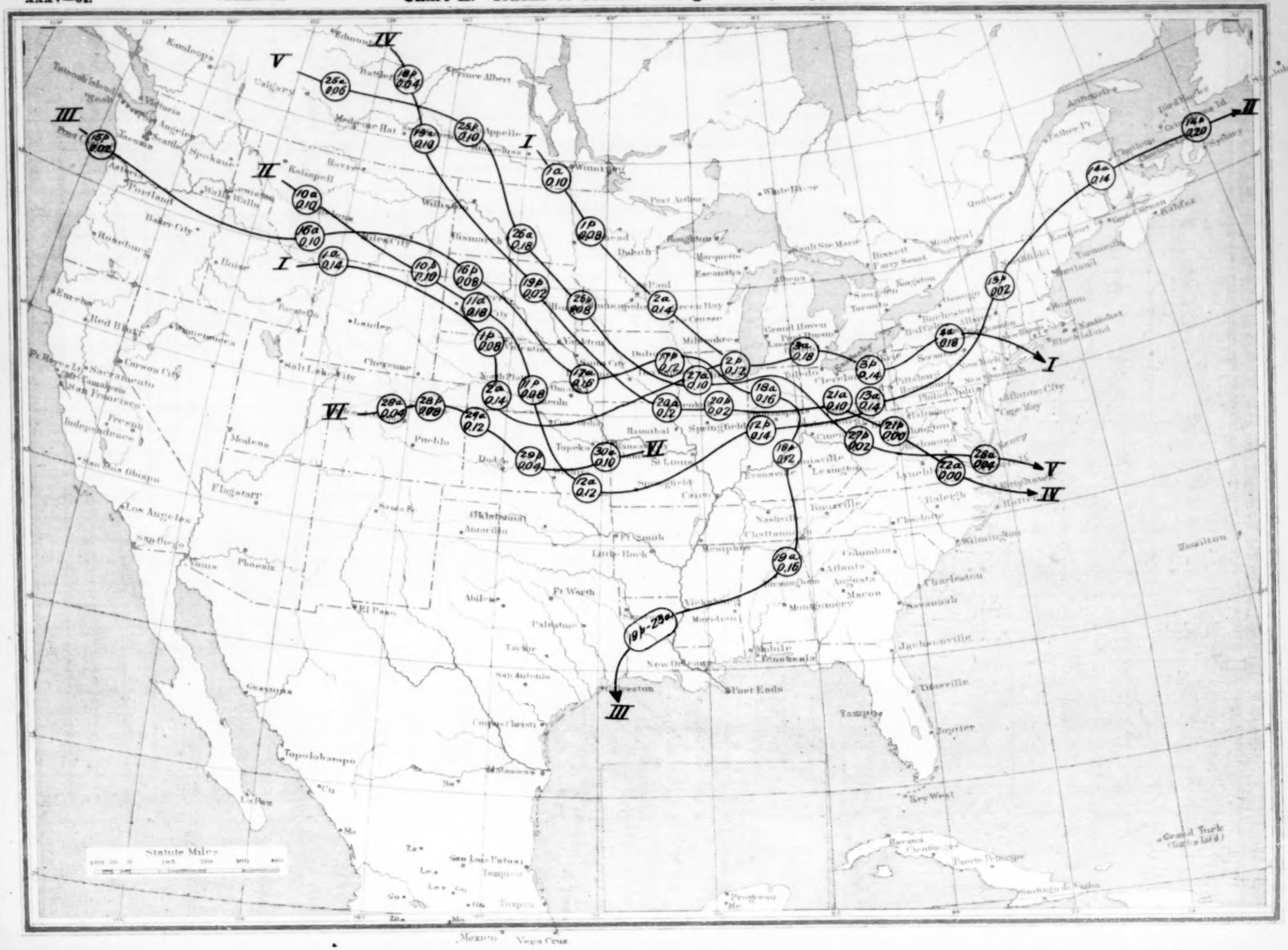
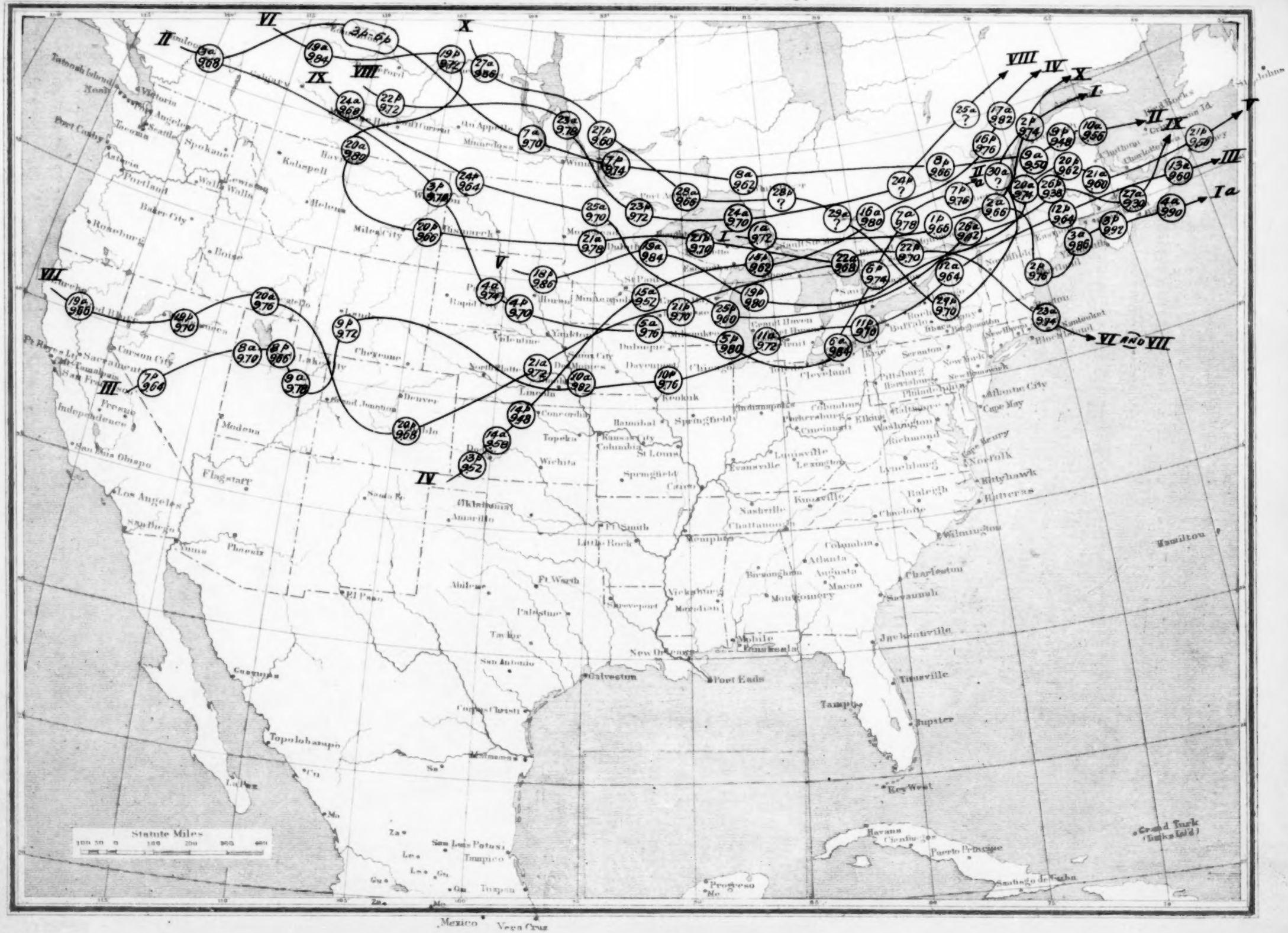


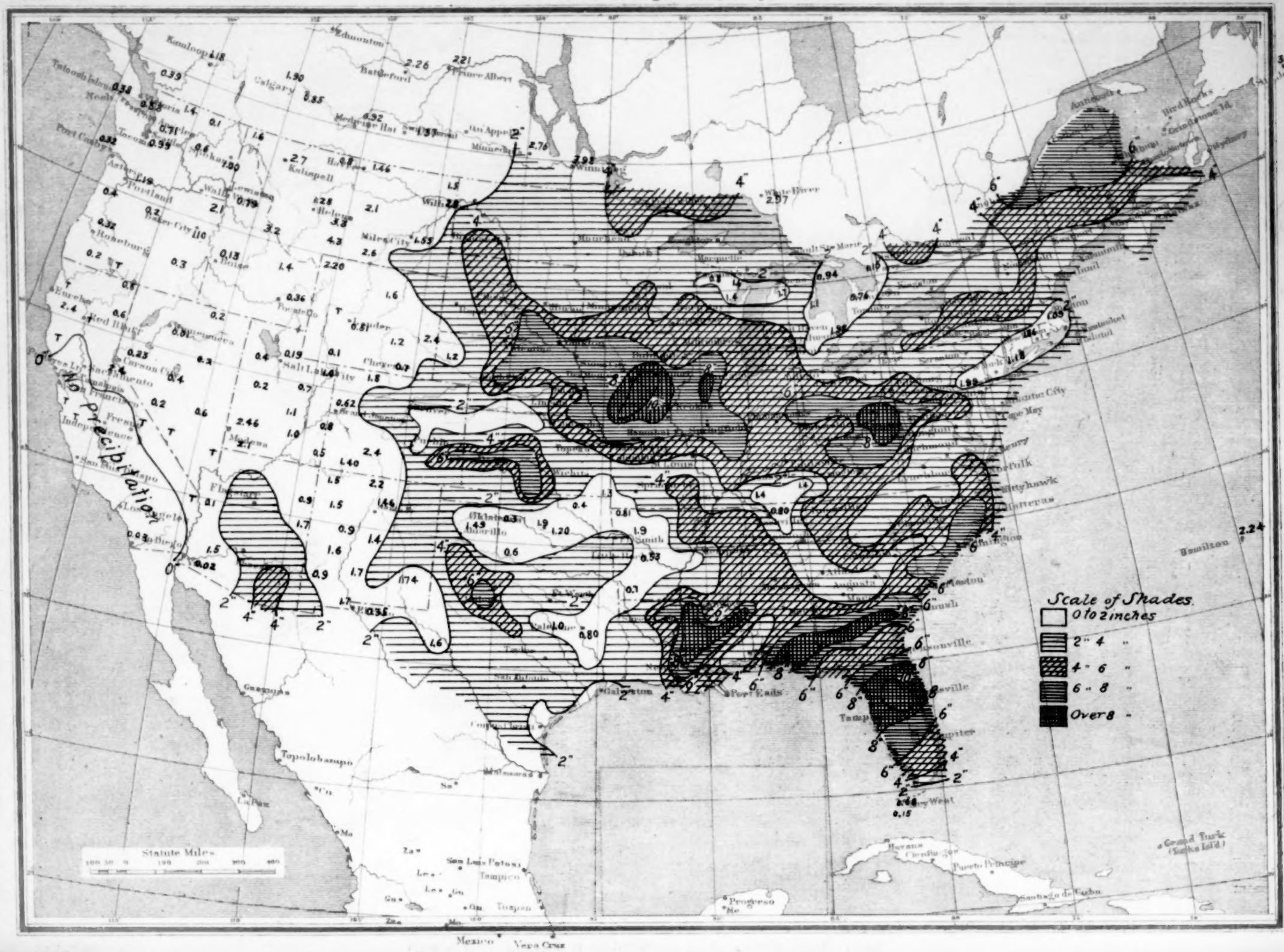
Chart III. Tracks of Centers of Low Areas, July, 1907.

Chart III. Tracks of Centers of Low Areas, July, 1907.


Statute Miles
100 50 0 100 200 300 400
Victoria
Seattle
Tacoma
Spokane
Portland
Baker City
Roseburg
Boise
Helena
Kalispell
Miles City
Bismarck
Minneapolis
St Paul
Duluth
Winnipeg
Port Arthur
Sault Ste Marie
Buffalo
Rochester
Toronto
Ottawa
Montreal
Quebec
Boston
Albany
Portland
Concord
Burlington
Augusta
Bangor
Eastport
St Johns
Halifax
Yarmouth
Sydney
Cape Breton
Prince Edward Island
Newfoundland
Port Crosby
Tatoosh Island
Neah
Port Angeles
Astoria
Walla Walla
Lewiston
Minneapolis
Grand Rapids
Duluth
Marquette
Escanaba
Milwaukee
Chicago
Detroit
Cleveland
Toledo
Buffalo
Rochester
Syracuse
Albany
Scranton
New York
Philadelphia
Atlantic City
Cape May
Pittsburg
Harrisburg
Baltimore
Washington
Richmond
Norfolk
Cape Henry
Kitty Hawk
Hatteras
Wilmington
Charleston
Savannah
Jacksonville
Tallahassee
Tampa
Jupiter
Key West
Havana
Cienfuegos
Puerto Principe
Santiago de Cuba
Grand Turk (Turks Isld)
Hamilton
Bermuda
Carson City
Sacramento
San Francisco
Reno
Lake City
Chugcune
Denver
Grand Junction
Pueblo
Lincoln
North Platte
Omaha
Des Moines
Dubuque
Sioux City
Davenport
Chicago
Rockford
Rockford
Peoria
Springfield
Indianapolis
Cincinnati
Columbus
Cleveland
Toledo
Fort Wayne
Kankakee
Milwaukee
Madison
Green Bay
Marquette
Escanaba
Houghton
Sault Ste Marie
Port Arthur
Winnipeg
Grand Forks
Devils Lake
Minot
Williston
Glendive
Miles City
Billings
Bismarck
Mandan
Dickinson
Huron
Aberdeen
Watertown
Sioux Falls
Yankton
Valentine
Rapid City
Pierre
Chamberlain
Mitchell
Huron
Aberdeen
Watertown
Sioux Falls
Yankton
Sioux City
Omaha
Lincoln
North Platte

XXXV—56. • Barkerville

Chart IV. Total Precipitation, July, 1907.



XXXV—57. • Barkerville

Chart V. Percentage of Clear Sky between Sunrise and Sunset, July, 1907.

Chart V. Percentage of Clear Sky between Sunrise and Sunset, July, 1907.

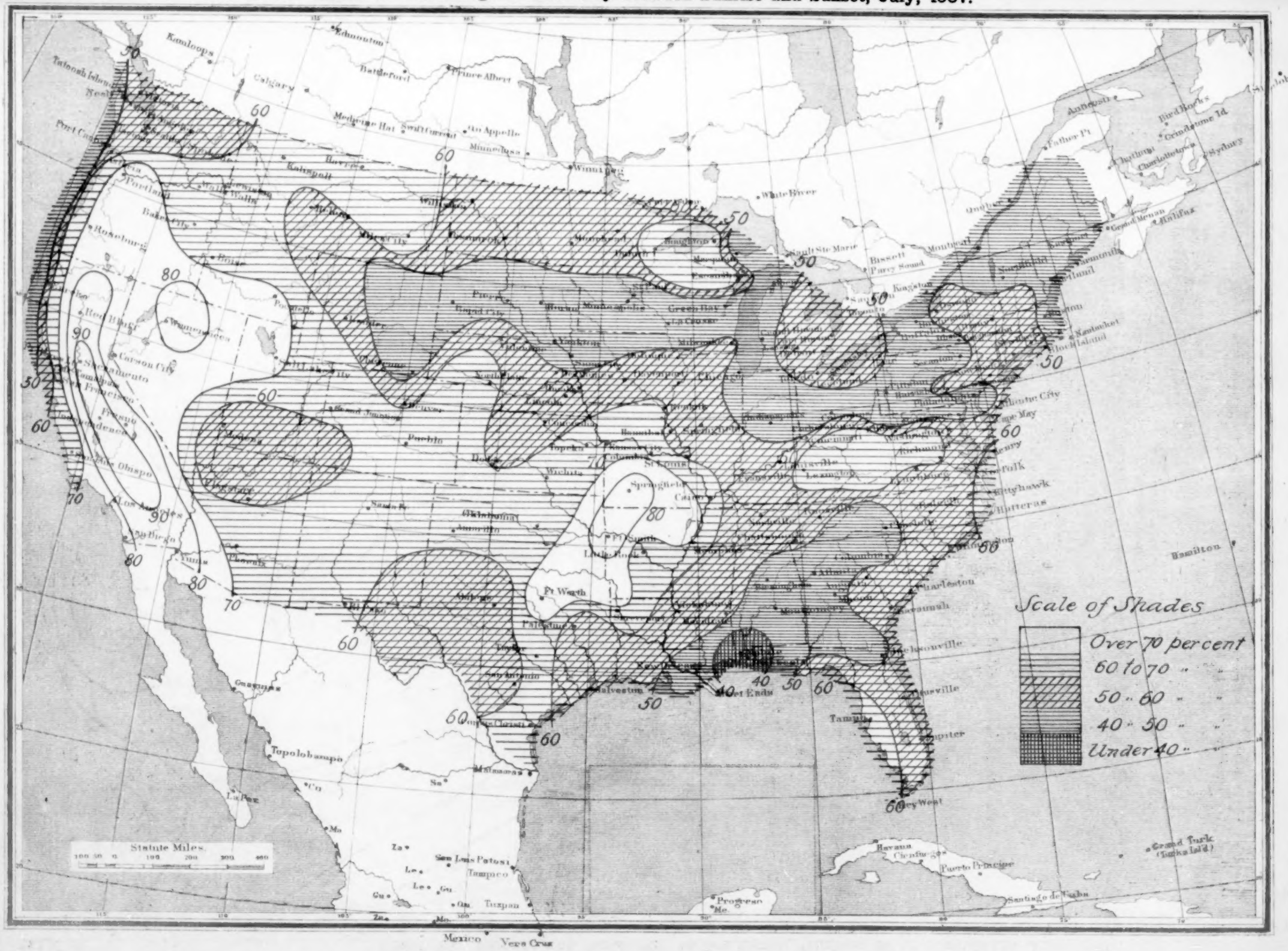
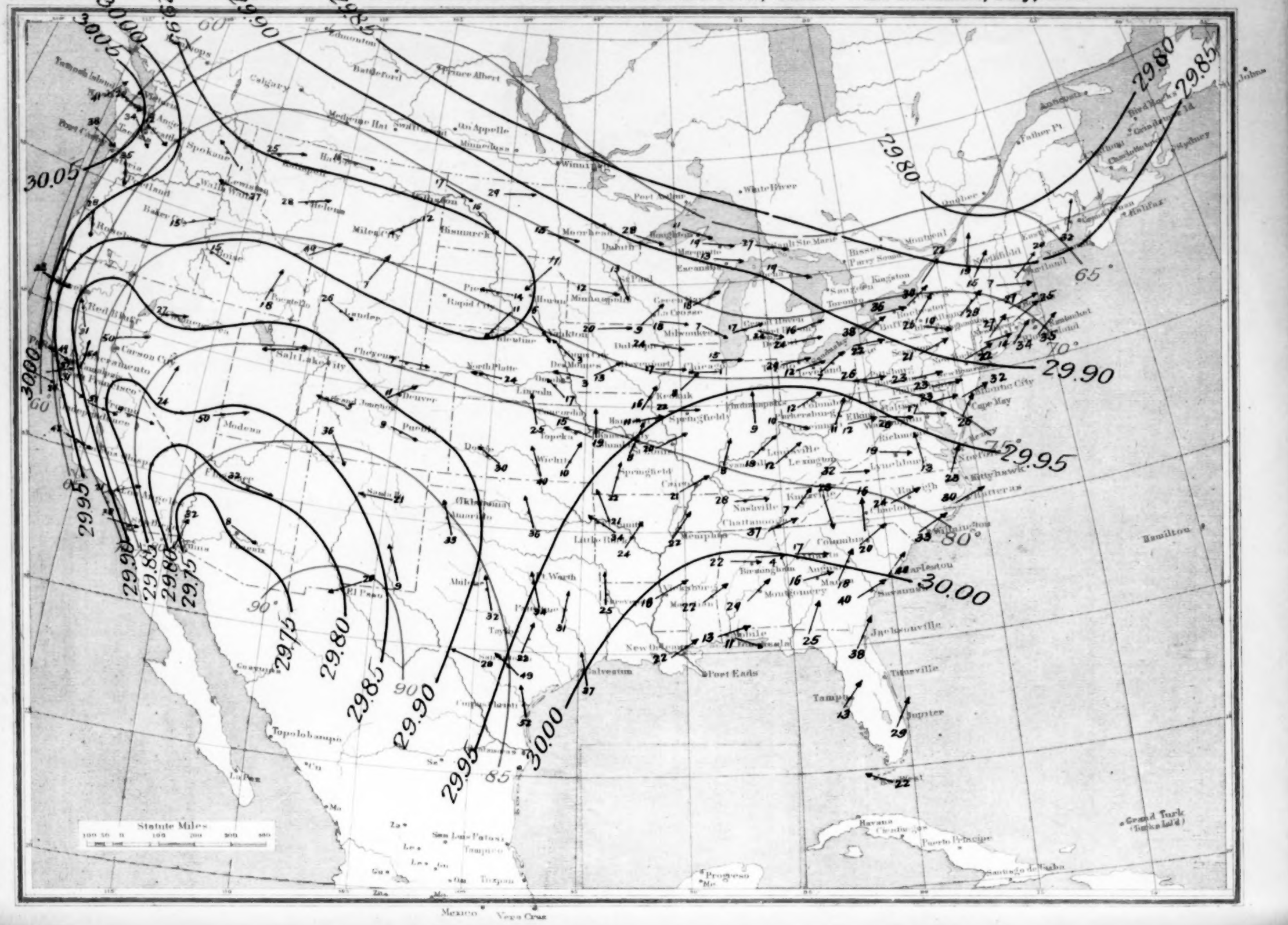
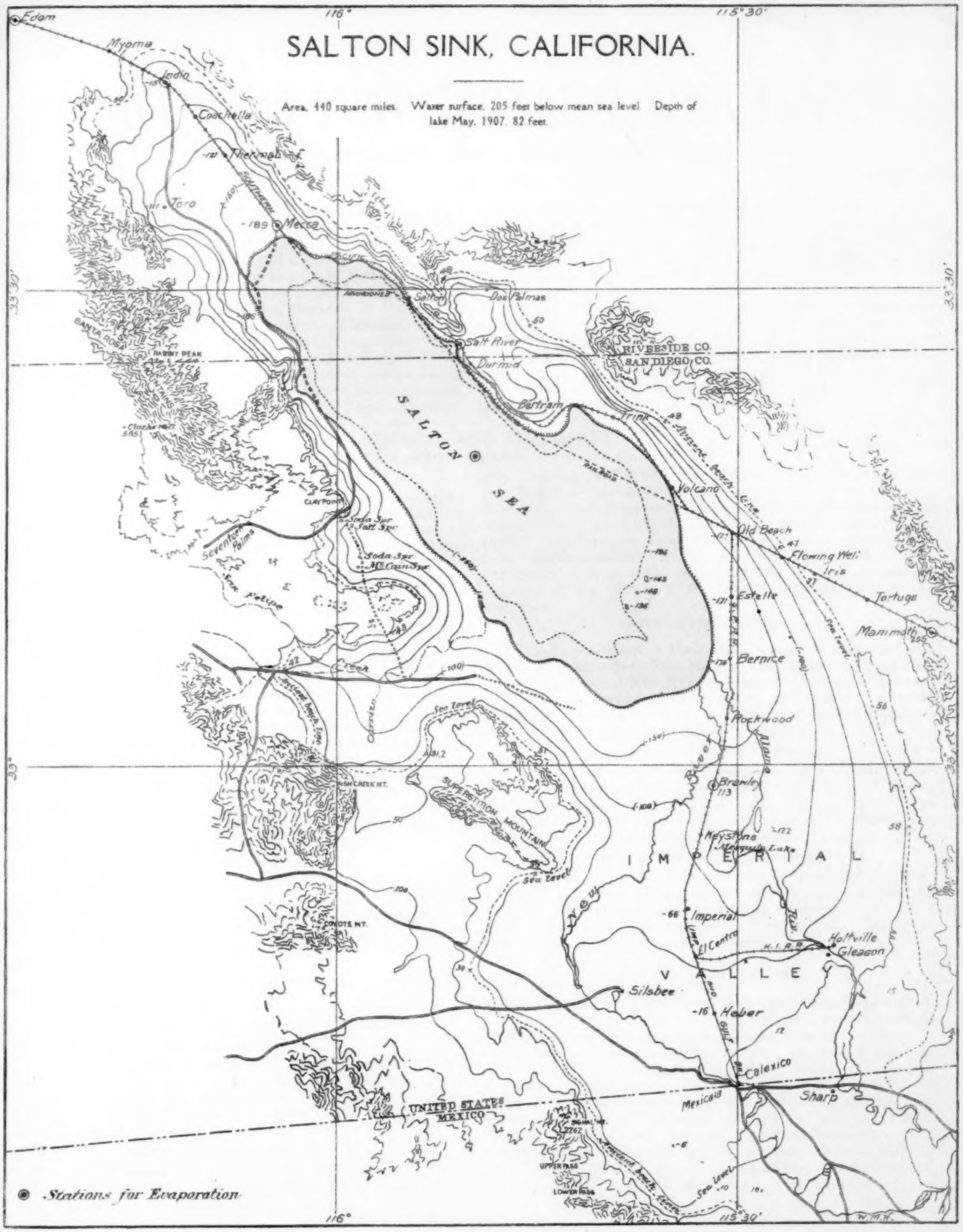


Chart VI. Isobars and Isotherms at Sea Level; Surface Wind Resultants, July, 1907.



SALTON SINK, CALIFORNIA.

Area, 440 square miles. Water surface, 205 feet below mean sea level. Depth of lake May, 1907, 82 feet.